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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
Branch of the Live Stock Commissioner

BEEF RAISING IN CANADA

COMPILED BY

J. B. SPENCER, B.S.A.

Bulletin No. 13

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.

APRIL 1, 1910

OTTAWA, April 1, 1910.

To the Honourable
The Minister of Agriculture,
Ottawa.

SIR,—I have the honour to present the accompanying treatise on the Beef Industry of Canada. This bulletin, which has been compiled by Mr. J. B. Spencer, B.S.A. of this Branch, will, it is hoped, be the means of disseminating much useful knowledge with reference to the breeding, feeding and marketing of beef cattle.

In its preparation every effort has been made to secure the most accurate and reliable data regarding the industry. The publication of this information, together with the views of experienced feeders, and, in many cases, descriptions of the methods which they have found most successful, should be of considerable value to all interested in the subject.

I herewith present the copy with the recommendation that it be published and printed for distribution as Bulletin No. 13, entitled, 'Beef Raising in Canada.'

I have the honour to be, sir,
Your obedient servant,

J. G. RUTHERFORD,
Live Stock Commissioner.

ACKNOWLEDGEMENTS.

In addition to the assistance afforded by those authorities whose names appear as the authors of articles or who are otherwise quoted in this bulletin, grateful acknowledgments are due a large number of breeders and feeders who supplied valued information in regard to their experience and practice. The sections on rearing and fattening are to a great extent compilations of answers to questions submitted to the following men:—

Thomas McMillan, Seaforth; J. Pickering, Brampton; F. W. Fisher, Burlington; Gavin Barbour, Omemee; J. Ransford, Clinton; Jos. Featherston, Streetsville; G. B. Hood, Guelph; John Low, Elora; D. A. Forrester, Clinton. John Campbell, Woodville; George L. Shipley, Falkirk; C. M. Simmons, Ivan; Wm. Elliott, Galt; John Richardson, Wyoming; Geo. P. Barrie, Galt; J. C. Ovens, Maple Lodge; A. W. Smith, Maple Lodge; Duncan Anderson, Orillia; all of Ontario.

George H. Pierce, Richmond; J. A. McClary, Hillhurst; John Watson, Upper Melbourne; George T. Page, Upper Melbourne; all of Quebec.

R. Robertson, Experimental Farm, Nappan; Albert Laird, New Glasgow; Robert Kaulback, Middle Muskodoboit; T. R. Trotter, Antigonish; F. L. Fuller, Agricultural College, Truro; Murray Brothers, Pictou; all of Nova Scotia.

Hammond J. Toombs, North Rustico; James Mutch, South Rustico; Frederick Bullman, Rusticoville; all of Prince Edward Island.

Valuable information was also provided by officials of live stock markets, abattoirs and others throughout the Dominion.

Credit is also due the *Farmers' Advocate* and the *Scottish Farmer* for the use of photographs illustrating certain breeds of cattle.

THE LIVE STOCK COMMISSIONER.

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BEEF RAISING IN CANADA.

THE BEEF BULLOCK.

The destiny of the bullock is the block and after that the table. Between the cattle raiser and the table is the market and it is the demands of this that must guide the stockman in his effort to produce the most valuable bullock. There is another consideration not to be forgotten and that is the interests of the breeder and feeder. It is through the medium of the bullock that much of the farm crop is marketed so that much of his success as a marketing medium depends upon his thrift, or in other words, his ability to consume large quantities of food and to convert the maximum of this into a valuable marketable product. It is therefore necessary in the description of an ideal bullock to consider him from the standpoint of the breeder and feeder as well as from that of the butcher, who sets the value upon the animal from the sort of carcass it will yield.

In order to produce a high-class bullock the breeder must possess a mental ideal of his object and work towards that model. This is as necessary to the cattle breeder as to the builder of any structure. An architect must mentally see the finished building before he can draw his plans and order his materials. The wide-awake stockman who attends a series of well conducted judging schools or visits a modern fat stock show of any magnitude and there intelligently studies the forms of the prize winning animals, will have established a mental picture of a superior beef animal. It is for the cattlemen out of reach of such educational institutions as these that the following description is prepared.

In judging an animal one looks first at its general appearance or outline. What is wanted is as nearly as possible a block formation, having comparatively straight lines, along the top and bottom and up and down at the back. A short neck, short legs and a good length of body are to be looked for in the model beast. The animal is compact and broad of back from shoulder points to hips, has a wide deep body; short and somewhat thick neck, wide deep and full bosom; broad, thick, fleshy hind quarters and a generally deep wide body. Viewed from the side the top and bottom lines of the body run practically parallel with the back quite level. From front or rear the outline should be rather full and broad. A straight upper line, or level back indicates a uniform covering of flesh, which is all important to the butcher while a straight underline denotes a good depth of barrel and chest. The former indicates a good feeder and the later a vigorous constitution and these are both essential. The butcher likes a medium amount of bone leaning to fineness in proportion to the size of the animal. Coarse bone is always objectionable as it indicates a large proportion of bone to meat, and it is meat that the market wants. Smoothness of conformation, largely determined by fineness of bone, goes with a tendency to lay on flesh smoothly in all parts—especially in the valuable parts of the carcass. An animal must not become baggy, showing lumps and rolls of fat. What is wanted is that the fat and flesh to be laid on smoothly and thickly, especially on the more valuable parts such as the loin and rib.

The head is a fairly accurate indication of an animal's quality. A long coarse head with spiky horns is usually associated with lack of quality throughout. An animal with an extremely short, broad head is generally inclined to lack length of body. While the short thick type is a good feeder, the butcher prefers greater length. A correct head may be described as being somewhat short with the features fine and clean cut such as one sees in a handsome man.

The feeder likes to see a moderately broad muzzle with a good wide mouth and a large open nostril. The mouth indicates the strength of the digestive organs and the nostrils the lung power of the animal. An animal with a narrow muzzle, thin lips and close nostrils is generally a poor feeder and bad thriver. The distance from the muzzle to a point immediately between the eyes is preferably short, with some 'dish' just below the eyes which should be wide apart, large and bright but not wild or restless. A placid though bright eye indicates vigour of constitution and gentle temperament, while a nervous restless eye denotes unsatisfactory feeding qualities. A sunken eye lacking in lustre denotes a weak constitution.

The ear and the horn are both worthy of observation in judging a beef animal. A heavy, coarse, fleshy ear loosely attached to the head indicates a low degree of quality and of vigour and consequently of ability to appropriate profitably large quantities of food materials. The horn (in the horned classes) should be flat rather than round. Round spiky horns indicate coarseness throughout. While a good head is important it is so more particularly to the breeder and feeder because of what it indicates. It is the body back of the head that concerns the butcher and therefore the price he will pay for the animal.

The neck of the beef animal tends to be short, thick and muscular, of medium depth, and neatly attached to the body. The shorter the neck the better, not only because it is a cheap part of a carcass but more particularly because a compact neck indicates ruggedness of constitution and good feeding qualities. On the other hand undue length and scrawnyness of neck indicates a poor feeder and a narrow body. The neck should blend well with the body, uniting with it so smoothly that the point of union is scarcely perceptible. It is because a strong, thick neck is associated with a broad chest and a good lung capacity that it is so important. The shoulder should be smooth and in a fattened animal well and evenly covered. Over the top there should be good width but openness between the blades is to be avoided. The top should be full and round. While the shoulder is a cheap part of the carcass it is important that it be smoothly and compactly covered, not only because of itself but more particularly because it goes with thickness and quality of meat in the more valuable cuts farther back.

Coming below the neck we have the front of the animal including the breast and brisket. The more width in front of the shoulder, the better the rest of the body corresponds. This gives capacity to the heart and lungs—the vital organs on which vigour so much depends. Prominence of brisket adds to the appearance of an animal but for practical purposes it is sufficient if it is plump and of good width indicating a roomy chest behind. A flabby ponderous brisket is objectionable as it is of no commercial value or other advantage. The front legs should stand well apart as this goes with a broad chest floor. It is important that the front legs have a wide muscular attachment of arm at the shoulder with plenty of room from arm pit to arm pit below the chest. The shorter the leg the better and each should come straight down whether viewed from the side or front.

A large heart girth is desirable. This goes with full fore flanks and well filled crops indicating not only a roomy chest cavity but a good covering of flesh on top. It is along the spine on either side that the butcher gets the best cuts, and unless a fat animal has plenty of meat here, no matter how much he may weigh he cannot command a high price. Thickness and smoothness over the ribs along the back are essential to a high-class beef animal. Taking the barrel as a whole the greater thickness and smoothness the better and from a feeder's standpoint, the greater depth the better also. The butcher wants all the length of barrel he can get but the feeder knows that extreme length means weakness. The rib should be well sprung giving large capacity, but over paunchiness is not a desirable feature as it means waste to the butcher and does not necessarily stand for improved feeding quality. To be an easy 'keeper' a bullock should be closely ribbed up, that is the space between the back rib and the hook point should not be great. Then the body should come well down at the flank.

The loin provides the highest priced roasts and steaks and therefore should be massive and thick. It should rise slightly from the straight line of the back. A

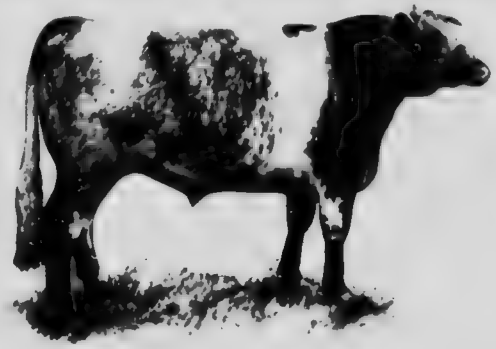

Fig. 1. Shorthorn Steer, "Roan Jim," an International champion, 1908.

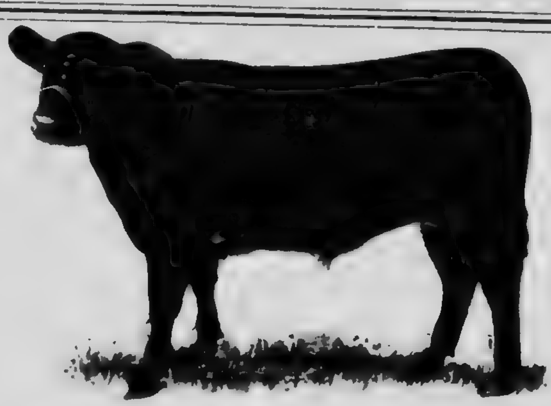

Fig. 2. Aberdeen Angus Steer, Champion Ontario Winter Fair, 1908.

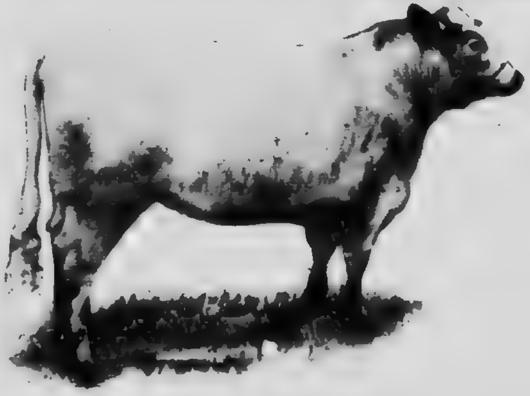

Fig. 3. A Choice Beef Bullock.

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sagging loin is decidedly objectionable for two principal reasons, first, that it denotes weakness and secondly that it lacks muscle. A low loin may be fairly thick but in such a case it is apt to consist largely of fat rather than lean meat.

In the early days of stock improvement wide hook points were highly esteemed but their uselessness from the butcher's standpoint has led to a modification of view regarding them. It is true they should be wide apart but not necessarily more so than the loin or sirloin. Consequently the feeder or breeder looks for the hook points rounded off smoothly, not standing up when finished, covered well and showing no signs of bareness. This will indicate a large proportion of flesh to bone.

The pin bones, situated at each side of the tail head should have fair width between, but prominence is not desirable. As a rule smoothness over the hook points goes with similar formation of these parts. Many animals have a tendency to develop patchiness at this point. In an old cow no serious objection can be taken to bunches of fat here but in a young animal it should not be overlooked as it is an indication of a tendency to form too much fat and is an evidence of lack of quality. The rump should be both long and broad; that is to say the distance from hook point to pin bone should be great, the width should be carried well back and be comparatively level. A droopy, peaked rump is a defective conformation, reduces the flesh capacity and detracts from the beauty of form. Viewed from behind, the quarters should be thick, showing a perpendicular line on the outside to where the thigh naturally narrows. On the inside the fullness should be carried well down. A split up appearance is decidedly objectionable. The thigh requires to be well packed on the inside and the flesh should be carried as near to the hock as possible. The expression 'Beef to the Heels' often heard among cattlemen is an extreme expression of what is admired at this point of a well finished beef animal of ideal conformation.

In the foregoing, reference has been repeatedly made to quality which is as important in a bullock as in a horse, a grade of wheat or a price of silk, if the best results are to be secured. The general appearance of an animal indicates its quality but a closer examination is also desirable. Quality is shown in bone, skin, hair, ears and horn. A coarse bone indicated by rough joints and heavy horns indicates lack of quality. Coarse, sluggish ears are not seen on a beast of fine parts. The hide is not only a safe guide as to the quality but it indicates the physical condition of the animal as regards thrift. The skin should be mellow and pliable, the hair abundant and silky. Taken in the hands the skin over the ribs should be mellow and pliable to the touch, easily grasped and stretched. A very thin hide or one that is thick, hard and boardlike are alike to be avoided in selecting a steer to feed or an animal to join the breeding herd.

THE FINISHED STEER.

A wise butter maker on being asked whether he considered it right to use butter colour answered that, if the market demanded Paris green in butter he would put it in. To succeed in the producing of butter or of beef the requirements of the purchaser must be complied with. The standard of the beef market has changed greatly in recent years. Not many years ago the best markets demanded large, heavy, thick bullocks, weighing 1,800 to 2,000 lbs., but that demand has changed and cattle of that description are no longer sent forward. The bullock that commands the highest price is a compact, well finished animal weighing not more than 1,500 lbs. on foot and if he weighs only 1,200 lbs. he will command the highest market price, provided he has the form, quality and finish. Even the thousand pound 'baby beef' is looked for by the man with the money on this side of the Atlantic, but such cattle are not shipped abroad. This change is greatly to the advantage of the producer, as other things being equal, the younger the animal goes to market, the less is the cost of food and the greater the profit to the producer. The British market demands cattle of moderate weights, good quality, and carrying sufficient fat in connection with the lean meat to secure a high degree of excellence without waste. To secure delicate flavour and tenderness a certain proportion of fat is necessary and this should be incorporated with the flesh or lean meat rather than appear only as a covering to the muscles. The great secret in producing a carcass of beef is to treat an animal in such a way that the fat grows with it during the entire period of its life time. It is unfortunately the too common practice of Canadian beef raisers to produce all the fat that an animal carries in the course of a few months. Much of the fat put on in this way is deposited on the outside of the carcass; it is largely wasted as it is useful for little else than tallow. The carcass that dresses out showing specks and streaks of fat throughout the lean tissue commands the highest price. Such beef is regarded as much of a delicacy as the finest turkey or lamb. The only way to be sure of prime quality is to maintain the animal in good condition by a system of liberal feeding from birth to maturity. Then the finishing period is comparatively short and the carcass produces the highly desirable marbled beef.

It will be gathered that the requirements of both the feeder and the butcher must be considered in the selection or breeding of the most profitable steer. The feeder must have in his animal good bone, roomy paunch and a deep broad chest, while to the butcher's steer these parts have no particular value because it is in these that much waste occurs. Giving the requirements of both feeder and butcher due consideration a standard of perfection has been built up in which each part of the animal is afforded a numerical value according to its importance. The following score-card agreed upon by many of the foremost demonstrators and instructors in animal husbandry will be of value to students who desire to become proficient in the judging of beef cattle.

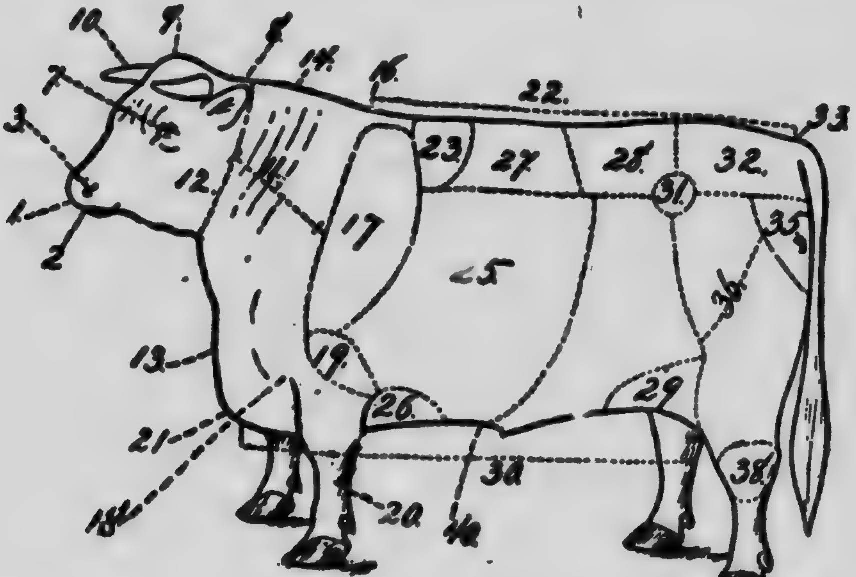


Fig. 4.—Points of Beef Cattle. Side view.

1. Muzzle.
2. Mouth.
3. Nostril.
7. Eye.
8. Ear.
9. Poll.
10. Horn.
11. Neck.
12. Throat.
14. Top of crest, or neck.
16. Top of shoulder.
17. Shoulder.
18. Point of shoulder.
19. Arm.
20. Shank.
21. Brisket.
22. Topline.
23. Crops.
25. Ribs, or barrel.
26. Foreflank.
27. Back or chine.
28. Loin.
29. Hind flank.
30. Underline, or bottom line.
31. Hip, point of hip, hook bone.
32. Rump.
33. Tailhead.
35. Buttocks.
36. Thigh.
38. Hock.
40. Navel.

Score-card for Beef Steer.

General appearance:—40.

Weight, according to age	10
Form, straight top line and underline; deep, broad, low set, stylish	10
Quality, firm handling, hair fine, pliable skin, dense bone, evenly fleshed	10
Condition, deep even covering of firm flesh, especially in the regions of valuable cuts	10

Head and Neck:—7.

Muzzle broad, mouth large, jaw wide, nostrils large	1
Eyes large, clear, placid	1
Face short, expression quiet	1
Forehead broad, full	1
Ears medium size, fine texture	1
Horns, fine texture, oval, medium size	1
Neck, thick, short, throat clean	1

Forequarters:—8.

Shoulder vein, full	2
Shoulders, covered with flesh, compact on top, smooth	2
Brisket advanced, breast wide	1
Dewlap, skin not too loose and drooping	1
Legs, straight, short; arm full, shank fine, smooth	2

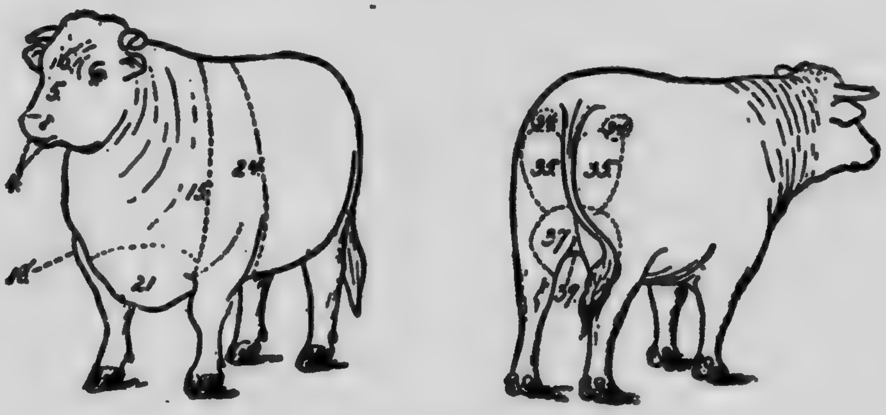


FIG. 5—POINTS OF BEEF CATTLE. FRONT AND REAR VIEWS.

4. Lips.
5. Face.
6. Forehead.
15. Neck vein, or shoulder vein.
18. Point of shoulder.
21. Brisket.
24. Girth.
34. Pin bones.
35. Buttocks.
37. Twist.
39. Purse.

Body:—32.

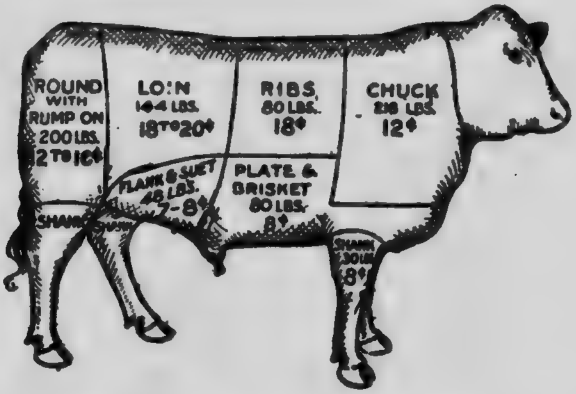
Chest, full, deep, wide, girth large, crops full	4
Ribs, long, arched, thickly fleshed	8
Back, broad, straight, smooth, even	10
Loin, thick, broad	8
Flank, full, even with underline	2

Hindquarters:—13.

Hips, smoothly covered, distance apart in proportion with other parts..	2
Rump, long, wide, even; tail head smooth, not patchy............	2
Pin bones, not prominent, far apart........................	1
Thighs, full, deep, wide..............................	2
Twist, deep, plump................................	2
Purse, full, indicating fleshiness.........................	2
Legs, straight, short; shank fine, smooth..................	2
Total...................................	100

COMMERCIAL CUTS OF A PRIME BULLOCK.

A prime bullock weighing about 1,400 pounds will dress out a carcass of about 800 pounds. The accompanying diagram shows the divisions of the carcass into the several cuts as understood by the trade. Cattle of a lower grade yield a smaller percentage of loin and rib than the diagram shows and these parts from such an animal also sell for a lower price per pound. The diagram shows about the retail selling price of the different cuts from a prime well-bred steer. The following paragraphs describe the location and use of each of the several cuts:—



ROUND WITH RUMP ON 200 LBS. 12 TO 16¢
LOIN 144 LBS. 18 TO 20¢
RIBS 80 LBS. 18¢
CHUCK 216 LBS. 12¢
FLANK & SUET 48 LBS. 7-8¢
PLATE & BRISKET 80 LBS. 8¢
SHANK
SHANK 30 LBS. 8¢

FIG. 6.—DIAGRAM SHOWING CARCASS CUTS.

Loin.—The loin of beef is subdivided into porterhouse or short cuts, T-bone and sirloin. The porterhouse consists of the first five or six steaks from the small end next to the ribs. Next to this comes the T-bone steaks, regarded by many as the very choicest part of the loin. The last six or eight steaks next to the round are known as the sirloin. The tenderloin is the inside portion of lean meat next the rib end of the loin. In some marakets the tenderloin is cut only from the cheaper carcases and the balance of the loin is used for canning in such cases. Where the tenderloin is cut from a choice carcass, a fancy price is charged for it, as it seriously injures the value of the remainder of the loin.

Round and rump.—The rump is the fleshy portion over the thigh. After it is cut off, the round extends on down to the shank, having only one bone near the centre.

Flank.—A section of lean meat overlies the flank which is stripped off and is known as the flank steak, and is much sought after. The balance of the flank is mostly used for sausage and hamburger, but can be boiled.

Ribs.—This section consists of the first seven ribs and is mostly used for roasts. The cuts nearest the loin are considered the choicest and sell for the most money. Next to the chuck the meat is deeper and rather coarser.

Chuck.—The lower eight or ten inches of that portion marked chuck is known to the trade as the 'clod.' This lies just above the brisket and extends up to the lower portion of the neck. This is cut mostly for pot roasts and contains much lean meat. Most of the chuck is cut into steaks, the best portions being on the end nearest to the ribs. The portion next to the neck usually sells for pot roasts or boiling.

Plate.—The plate is the lower portion of the carcass below the ribs, taking in the covering of the belly. It is mostly used for boiling but contains some good meat.

Brisket.—This takes in the portion between the shank and the clod, or lower part of the chuck. It is a very fleshy piece with some heavy bone, but makes fine pot roasts or boiling meat.

Shank.—That portion of the shank from the knee or heel to the cut above, is fleshy, though coarse, and is mostly used for boiling. The lower part is mostly bone and sinew and is for soup and boiling. In the forelegs this is called the shin.

Neck.—This part usually sells with a part of the chuck and is fit mostly for boiling. It is fleshy but coarse.

Sirloin ends.—In some markets the ends of the sirloin and T-bone steaks, which run down into the flank, are cut off at the point where the flesh widens and are sold separately. These ends are coarser than the loin meat, but properly cooked are as good as any part of the animal.

MODERN BREEDS OF BEEF CATTLE.

The rearing of cattle is closely associated with successful agriculture. In any farming country the standard of agriculture may be measured by the quality of cattle kept by its farmers. Not only does the character of the animals found in the barns reflect the field practice of the proprietor but the very presence of superior stock inspires advancement in all associated branches of the industry.

While cattle are employed even yet in parts of Canada, for labouring purposes the chief end of the bovine race is the production of food products. Whether belonging to the beef, the dairy or the combination class, excellence of quality is measured by the suitability of the animal for the purpose intended. Excellence, again, is dependent upon improvement at the hands of man. Unimproved or original cattle possessed a fair degree of vigour; they were slow to mature, yielded only light carcases of poor flesh, and the cows, like mammals of the forest, gave only sufficient milk to sustain their offsprings for a few months or until the young things were able to gather a livelihood from their own pickings. Even to-day in districts far behind in agriculture the cattle are little better than were the unimproved specimens found in Europe previous to their division into classes and breeds as they are found at the present day.

All of the improved breeds of cattle reared to any extent in Canada to-day come to us from Europe, and with the exception of the Holstein-Fresian, the Dutch Belted and the Brown Swiss practically all have been originated within the British Isles.

Until agriculture in Great Britain became organized into inclosed cultivated farms there was little or no improvement in the cattle stock of the country. With the advancement in field practice there came about more care in the selection, perpetuation and feeding of the cattle. Certain districts were favourable to special lines of development and in each district were found men who took a leading part in working toward what seemed to them most desirable. Occasionally importations of sires from other districts and foreign countries were made when such animals could be found as were believed to possess qualifications of a desirable sort. There was, however, comparatively little interchange of stock between different parts of the Kingdom which condition was favourable to the beginning of what later became distinct breeds. In the following pages a brief history of each of the leading breeds of cattle reared in Canada is given together with descriptions of characteristics and other information regarding each.

THE SHORTHORN.

By C. M. MacRae, B.S.A., Live Stock Branch.

This breed of cattle, now widely distributed over the face of the globe, is descended from the old Northeast of England breed, variously designated as the 'Durham,' 'Teeswater,' 'Yorkshire' or 'Holderness.' Some authorities think that the breed originated by mating the aboriginal cows of Ancient Northumbria with large bulls from Holland, or the Netherlands. This would account for the excellent milking qualities of the early Shorthorns, also their short horns, both being inherited from their Continental sires.

Even before their improvement by the Messrs. Colling, Bates, Booth and others, they were regarded by many as the best race of cattle in England and are described as having large, square frames, table backs, prominent hooks, deep milking qualities and an aptitude to fatten, although their flesh was somewhat coarse in texture and unevenly distributed. They had short horns, good handling qualities, and in colour were generally red, white or roan, or occasionally showing a yellowish tinge. It will thus be seen that the breed at this date possessed many of the dominant characteristics of modern Shorthorn, but they needed the guiding hand of the master breeder to overcome their defects and to intensify and perpetuate their inherent good qualities.

The first systematic improvement of the breed, of which we have any reliable record, was conducted by the Colling Brothers (Charles and Robert) during the last two decades of the 18th century; although it is well known that many herds of excellent cattle, carefully selected and well bred, existed prior to that time. Private records were kept by several owners and some of these date back two centuries.

About 1783, these brothers, after a careful study of the methods of breeding practised by that pioneer experimenter in this field, Robert Bakewell of Dishley Hall, Leicestershire, in improving Leicester sheep and Longhorn cattle, began laying the foundation of their Shorthorn herds, Robert Colling at 'Bampton' and Charles at 'Ketton,' illustrious names in Shorthorn history. On the former herd of seventeen select cows, the bull 'Hubback' was for a few years used with remarkable results. From this herd sprung such noted families as the 'Princesses,' 'Red Roses,' 'Bright Eyes,' 'Wildair,' etc., and among the great sires produced were: 'Punch,' 'Ben,' twin brother to 'Ben,' 'Colling's White Bull,' 'Marske,' 'North Star' and 'Phenomenon.' The 'Ketton' herd was founded on what was afterwards said to be four of the best cows in England, of which were 'Duchess,' the progenitor of that famous family so closely identified with the name of Thos. Bates, and Lady Maynard. From his brother, Charles got the bull 'Hubback' but sold him again after only two years' use, showing that neither of the brothers appreciated the worth of this bull, although it is undoubtedly to his influence that the first great improvement of the breed may be traced. Many Shorthorn pedigrees run back to the 'Ketton' herd, where such wonderful sires as 'Foljambe,' 'Favourite,' and 'Comet' were produced.

The Colling brothers were shrewd business men and early saw the advantage of bringing the merits of their cattle before the public. One of their advertisements was the selling of the 'Durham Ox' by 'Favourite' to John Day, who for six years exhibited him throughout England and Scotland. At ten years of age this ox weighed some 2,400 pounds. Later, Robert Colling's pure bred free Martin heifer, known as the 'White Heifer that Travelled,' weighing about 2,500 pounds was fitted and sent through the neighbouring counties.

The practice of hiring out bulls to breeders was another means adopted to advertise the breed. Finally, the high prices realized at the Collings' dispersion sales in 1810 and 1820 not only widely advertised the breed but greatly increased its popularity.

In-and-in breeding had been closely followed by the Collings with, as has been intimated, marvellous improvement to the breed, but the early dispersion of the 'Ketton' herd would indicate that the founder had grave misgivings as to the future under the continuance of such a policy. While the blood of these two herds was extensively used for the improvement of many other herds, two names stand out conspicuously, the Booths and Thos. Bates, founders of different types, regarding the respective merits of which, the most intense rivalry existed for half a century.

The Booths at 'Killerby' and 'Warlaby' struck off on an independent line to improve on the work of the Collings but largely used Collings' bulls. They aimed to produce a thick fleshed, easily fattened animal, without particular reference to milk production, or to that style so much emphasized by their rival Bates, who, on the other hand, insisted on beautiful form, stylish carriage, and good milking qualities.

Space forbids even a summary of the wonderful achievements of those master breeders; tribes and families were founded, sires of the most impressive prepotence were produced. The Booths with their 'Braclets,' 'Necklaces,' 'Mantilinis,' 'Blossoms,' 'Farewells,' 'Moss Roses,' and 'Lady Fragrants,' and the produce of such bulls as 'Pilot,' 'Crown Prince,' 'Windsor,' 'Commander in Chief,' and many others added to the fame of their chosen type and won victory after victory at the agricultural exhibitions of their day.

Thos. Bates, at 'Kirklevington,' carried the concentration of blood lines to the farthest possible extreme. He insisted that Shorthorns, not possessing the blood of 'Hubback' were unworthy of record in the Herd Book. Crossed and doubled-crossed the blood of 'Favourite' made a crowning hit in the production of the great bull 'Duke of Northumberland' and established many noble families, prominent among which were the 'Duchesses,' 'Oxfords,' 'Waterloos,' 'Wild Eyes,' etc., etc. Around the former of these tribes centered the wildest speculation excitement in the records of animal husbandry, culminating in 1873, when at the famous New York sale, the '8th Duchess of Geneva' brought at auction $40,600, the highest price ever paid for a any single animal of the cattle species. Fads in breeding had been carried too far, pedigree alone was of value, animals of the desired blood lines were retained on breeding herds irrespective of individual merit and disaster was not long in overtaking the mad speculative craze that took possession of Shorthorn breeders in America as well as in England.

Early in the past century the merits of the Shorthorn began to be appreciated in Scotland. Scottish breeders, however, aimed chiefly at the production of a class of cattle capable of turning grass and turnips into beef at a profit, and in their anxiety to do this they sacrificed, to some extent, the size and also the milking qualities of the breed, though not to such an extent as was done later in America. Prominent among the early breeders stand the names of Robertson, Rennie, Barclay and Grant Duff, but better known than any of these are the names of Amos Cruickshank of Sittyton, and his brother Anthony. To Amos belongs the credit of breeding up and fixing the type of the popular Scottish Shorthorn of to-day.

Cruickshank adhered to a fixed purpose all through his life, viz.:—to produce a race of early maturing, sappy animals, that would pay the rent. His ideal was a low-set, stout-middled, thick-fleshed animal, with strong constitution and good feeding qualities. From 1837 to 1860 he bought wherever he found what came near his ideal regardless of price. He visited the chief herds on both sides of the border and attended the principal sales, always in search of individuals to improve his cattle. He was indifferent to fashionable pedigrees, caring more for good individuality especially in the bulls purchased to head his herd. In 1858, Wilkinson of Lenton, a noted breeder, offered him 'Lancaster Comet,' then in his eighth year. This bull had proved a good sire, but when Amos Cruickshank saw his great head and horns over the side of the railway truck, he was so disappointed that he sent 'The Highland Bull,' as one of his neighbours called him, to the Clyne Farm to be out of sight. There in 1859 this bull served a dozen cows that had failed to breed the year before. Being left out late that fall, he contracted rheumatism and was sent to the shambles. One of his calves 'Champion of England' became the greatest stock bull ever owned in Scotland, and his progeny were afterwards bred incestuously to fix the type, and it was building upon a 'Champion of England' foundation that the Sittyton herd reached that state of perfection which made it famous. Shortly after this date Cruickshank gave up testing outside bulls, and used only home bred ones until 1899 when he dispersed the whole herd, which, at times, had numbered three hundred cattle. No doubt the main reason for selling out lay in the fact that he, like Bates, had inbred to such an extent that an outcross had become necessary. Outside bulls had in the past proved unsatisfactory so, rather than take the risk of impairing the excellence and reputation of his cattle, he dispersed his herd and retired. At this sale the largest purchasers were Duthie, Willis, and the late William Marr, though animals went to many other buyers, both in the Kingdom and the Americas. These men are still recognized as foremost breeders of the Cruickshank type of cattle amongst a host of others scattered over the face of the globe.

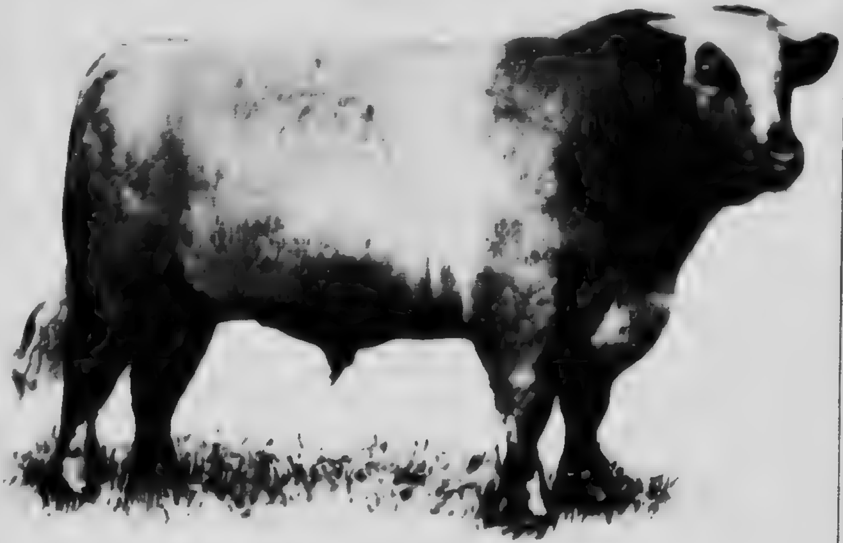


Fig. 7. Shorthorn Bull, aged 3 years and 2 months, "Chid ngstone Malcolm,"

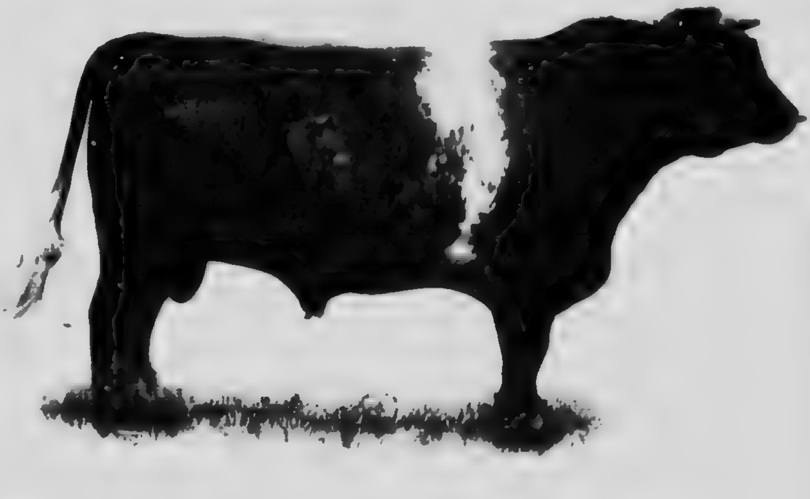


Fig. 8. "Topsman's Duke,' a famous sire, bred, reared and used in Manitoba.

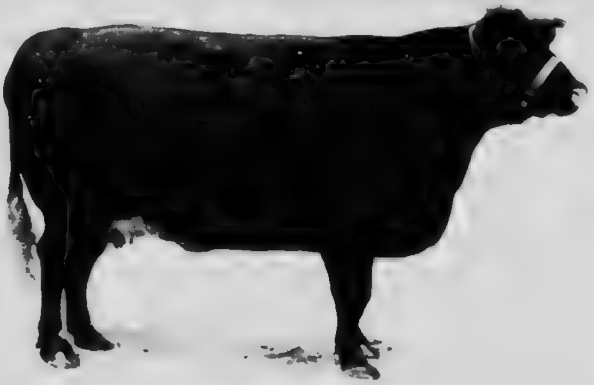


Fig. 9. "Marchioness," a Champion Shorthorn at Winnipeg Exhibition.

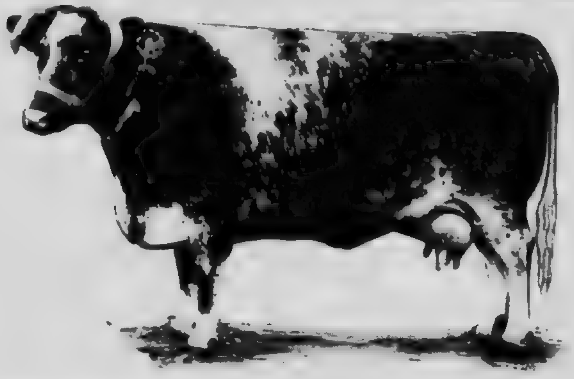


Fig. 10. Shorthorn Cow "Sweetheart," a Champion at the Royal Show of England.

Fig. 11. Shorthorns on a Saskatchewan Stock Farm.

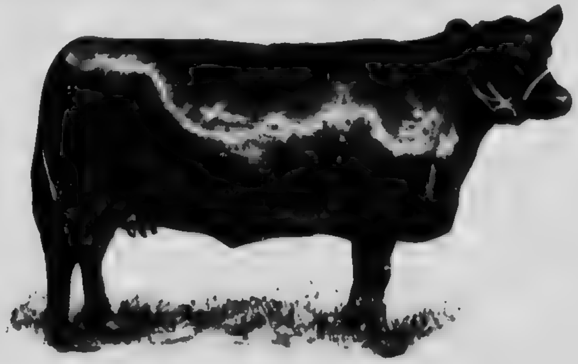


Fig. 12. Champion Aberdeen-Angus Heifer at British shows.

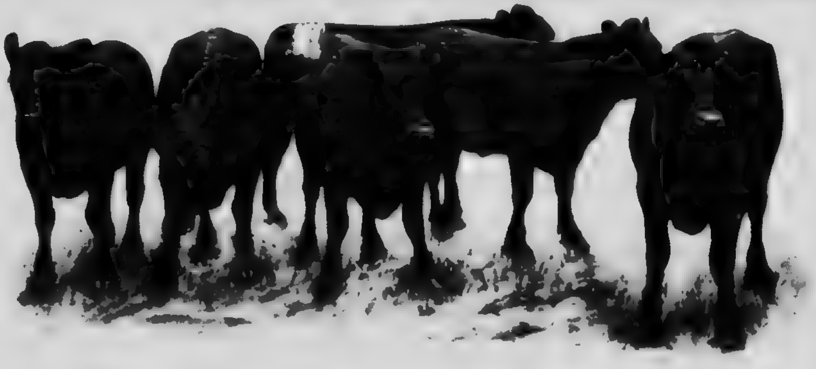


Fig. 13. A group of Angus Heifers reared in Saskatchewan.

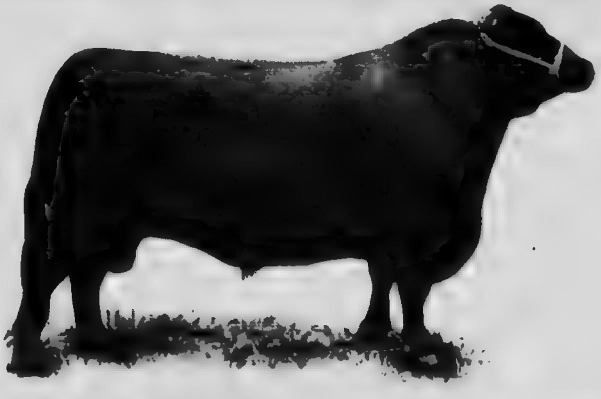


Fig. 14. Aberdeen-Angus Bull "Wizard of Marsmore," a Scottish Champion.

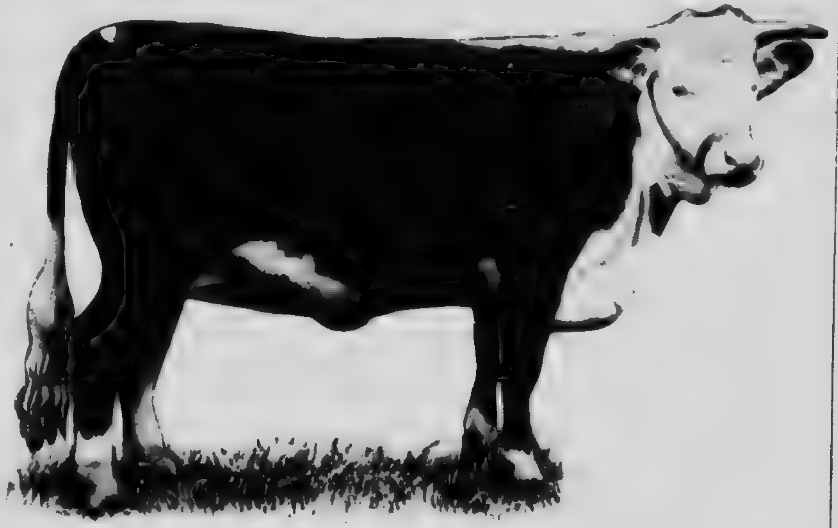


Fig. 15. Hereford Heifer, "Ashleaf III."

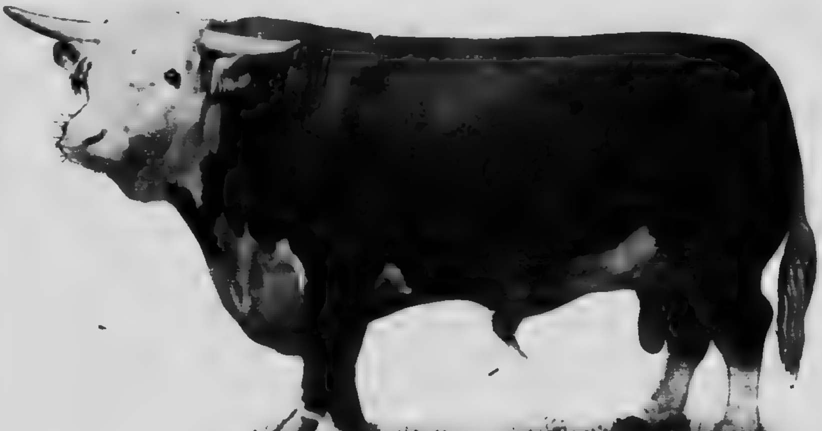


Fig. 16. Hereford Bull "Happy Christmas," head of a Manitoba herd.

When the leading and prominent breeders follow one particular line of breeding, or a certain type becomes fashionable, the rank and file are sure to fall into line. In these latter days the 'Scots' type has almost become a fad; size, style, and milking qualities have to some extent been lost. It is, however, a fact worthy of note that some of the prominent breeders of Great Britain are introducing Bates' blood as a top cross on the Scots in order to revive these most valuable qualities, and some such course seems absolutely essential if this noble breed is to hold its own as the 'farmers' cow.'

Characteristics.

The Shorthorn is unquestionably the most popular breed of cattle in the world to-day, as well as the most cosmopolitan. They are hardy and thrifty, have size, without coarseness, are kindly and docile, readily taking on flesh, which is of good quality and distributed evenly and smoothly on the most valuable parts of the carcass. They mature early, are fairly good grazers and make excellent feeders, standing even long periods of forced feeding well. They cross well with other pure breeds and are unexcelled for improving common cattle, imparting size, quality and early maturity, improving the fattening properties, and frequently the milking qualities.

Like other breeds they have defects. In some strains, families and herds, are animals of impaired constitution and tendencies towards sterility, resulting from too close breeding, highly artificial treatment, accompanied with poorly ventilated housing and excessive show yard fitting.

Not only is the Shorthorn a beef producing animal holding its own with the most highly developed special purpose beef breeds, but many families possess the double characteristic of being deep milkers also. They are undoubtedly the best milkers of the beef breeds and are frequently spoken off as a dual or general purpose breed. Away back in the early days of the breed's history they were known as good milkers. In 1810, Chas. Colling reserved from his dispersion sale the cow 'Magdalena' by 'Comet' which, as a milker, would be eligible for a place among record breakers. She gave 32 quarts a day on ordinary feed. That this important trait has not been entirely lost, the following statistics gathered from reliable sources are quoted to show what this popular and useful breed can do as milk and butter producers:—

Pure Bred Shorthorns.	Age	Milk.	Butter.	Owner.
		Lbs.	Lbs.	
Darlington Lass	9	9,657	435·5	C. E. F., Ottawa.
Campbell	6	9,603	418·	Wis. Exp. Stn.
Miss Molly	12	7,430	412·3	C. E. F., Ottawa.
College Moore	....	8,734	409·	Iowa Exp. Stn.
Marchioness	8	8,488	404·4	C. E. F., Ottawa
America	6	8,066	403·3	Utah Exp. Stn.
College Belle 2nd	...	7,554	355·	Iowa " "
Maggie Hughes	5	5,840	401·	Utah " "
Jane	10	7,683	346·	Wis. " "
Mary Clay	9	5,774	325·	Utah " "
Rose of Glenside	8	18,075	624·76	May & Ottis, Penn.
Average for 11 cows	....	9,736	410·3	

As will be noted the above records were made in Canada and the United States. Other authentic records of high producing Shorthorn cows are shown farther on in this bulletin in an article on the establishing of a commercial herd of general purpose cows.

The Breed in Canada.

Shorthorn cattle were imported to this continent before the end of the eighteenth century, but it was not until 1825 that they were brought into Canada. About that year four bulls were imported into New Brunswick by the Board of Agriculture of that province. Judge Robert Arnold, of St. Catherines, Ont., was actually the first breeder of Shorthorns in Canada. In 1832 he purchased from Chas. Henry Hall, of Harlem, New York, the cow 'Countess—782.' From her he reared ten calves, including 'Leopold—761' and 'Wellington—1154,' which became famous sires. The descendants of this cow are widely scattered over this continent. In the same year (1832), Mr. G. W. Smith, of St. Thomas, Ont., imported a cow and a bull from England, but soon disposed of them to breeders. The following year (1833), six heifers and a bull were brought out by Roland Wingfield, an Englishman, who soon afterwards sold them to John Howitt of Guelph. This lot included 'Lily—302,' and 'Pedigree—408,' which yielded several heifers to whom many Canadian Shorthorns trace. From that time forward importation increased year by year. Robert Wade of Coburg, Hon. Adam Fergusson of Woodhill, F. Boyd of Young street, Toronto, Messrs. Geo. and John Simpson of Newmarket, Col. Burrows of Brantford, Wm. Ashton of Galt, Ralph Wade, Sr., of Port Hope and a number of others had all made importations prior to 1850. Soon after that date importing on a large scale was commenced. Wm. Ashton of Galt, brought out a large shipment in 1854, which year Geo. Miller of Markham, Wm. Miller of Claremont and F. W. Stone of Guelph, commenced to import Shorthorns. Among the animals brought out at that time were the celebrated bull 'John O'Gaunt 2nd—140,' 'Beauty—30,' 'Lady Jane—281,' 'Lily—302,' 'Louisa—304,' 'Miss Syme—369,' 'Young Snowdrop—564,' 'Red Rose—455,' 'Roan Duchess—460' and many others whose names appear in the pedigrees of prominent herds of the present day.

According to the records there had been imported into Canada previous to 1860 upwards of 160 head. While a large number of these animals and their pure bred descendants were sold to go to the United States, it is safe to infer that up to that date, a half a century ago, there were many thousands of pure bred Shorthorn cattle in Canada. It is not to be wondered at that the Red, White and Roan at the present time fills so large a place in the beef cattle industry of the Dominion. The breeding and importing of Shorthorns had in the sixties become a well established industry.

To the ranks of men already financially interested in the business are being added recruits almost every year. Among outstanding importers of the last quarter of the past century were Simon Beattie, Markham, Ont.; H. M. Cochrane, Hillhurst Que.; James I. Davidson, Balsam, Ont.; Hon. David Christie, Paris, Ont.; Hon. George Brown, Brantford, Ont., and John Miller, Broughton, Ont. While much distinction came to the breed through the enterprise of each of these men, the names of Cochrane and Davidson stand out, the former because of the prominence given the Duchess family, and the latter the Cruickshank strain and type.

Pedigree Registration.

Pedigree registration for Shorthorns commenced about 1820. The first volume of the English Shorthorn Herd Book was published in 1822 by George Coats of Carleton, Yorkshire, England. Four years later five volumes had been published. In 1846 the first volume of the American Shorthorn Herd Book appeared. It was published by Lewis F. Allen of Buffalo, New York. Other United States Herd Books sprang up but all were purchased by the American Shorthorn Association in 1882. Up to the end of 1908, seventy-three volumes of the American Shorthorn Herd Book had been completed, containing the pedigrees of 307,000 bulls and 467,895 cows and heifers.

Registration was commenced in Canada about 1854, but, it was not until 1867 that a Herd Book was printed. This Book, known as the Canadian Herd Book, admitted the pedigrees of females having four and males having five registered top crosses. In 1881 the British American Shorthorn Association was organized. By this body the rules of entry were changed, admitting for registration only such animals as traced directly to stock imported from Great Britain A few years later the Dominion Shorthorn Breeders' Association absorbed the two former Herd Books, and in 1887 the first volume of the Dominion Shorthorn Herd Book appeared. Up to December, 1909, twenty-six volumes containing the pedigrees of 77,670 males and 89,882 females had been issued.

THE ABERDEEN ANGUS.

Aberdeen Angus cattle, as found in herds scattered over the beef raising countries, occupy a prominent place among the beef producing breeds of the world. Although descended from dairy stock of no mean quality its milking powers have been rather neglected while meat production has been made the first object of the adherents of the breed. It is therefore not astonishing that the Aberdeen-Angus breed has fought its way in recent years to many championships in fat stock show rings on both sides of the International boundary and of the Atlantic.

While the breed possesses a comparatively long and honourable history, it is within a space of less than forty years that the native cattle of Angus and Aberdeen have spread to distant continents, where they now command the esteem of ranchmen and farmers. On the ranches of Canada and the United States, as well as the estancias of Argentina, the veldts of South Africa, and the grazing areas of Australia and New Zealand, there may to-day be found feeding and echoing back to its native land fresh laurels as their merits become known.

The history of the improvement of the breed which extended over the greater part of the nineteenth century may be regarded as really that of the breed, for it was in the course of its improvement that the breed acquired distinctness and fixity, chiefly in the hands of a few eminently skilful men.

Historians of the breed place the name of Hugh Watson of Keillor in the front rank of improvers of the polled cattle of Forfarshire and Aberdeenshire. Mr. Watson, born in 1789, commenced farming on his own account at Keillor in 1898 with half a dozen of the best and blackest cows and a bull from his father's stock. In the same year he added to his herd ten heifers of various colours and a black bull named 'Tarnty Jock,' the first 'Jock' of the Keillor herd. With this stock the foundation of his herd was well and truly laid. Two years later Mr. Watson commenced exhibiting his cattle and other stock at the leading shows, and during his lifetime he is credited with winning for various kinds of stock in England, Ireland, Scotland and France upwards of 500 premiums. In 1829 he competed at the Highland Society Show and the Smithfield Club Show, after which the results of the block test added greatly to the rising fame of the breed.

The sire which was accounted to have exerted the greatest influence in his herd was 'Old Jock,' registered as No. 1 in the Herd Book, fourth in the direct male line descended from Tarney Jock,' already referred to and described by his breeder's son, as in his breeder's opinion, the best bull he had ever bred, a grand grazing animal, of iron constitution, and superlative quality. As a yearling in 1843 he won first honours of the Highland Society, and again in 1846, and at ten years of age the Sweepstakes award.

Of the female polls at Keillor, 'The Prince Cow,' registered as 'Old Grannie No. 1,' was distinguished on account of her longevity, fecundity, and excellence as a breeder. She died of old age in the middle of her 36th year after yielding 25 calves. Her last son 'Hugh—130' calved in her 29th year, proved a famous sire in the herd of Thomas Ferguson of Kinochtry. A four-year-old ox, son of 'Old Grannie,' won the Purcell Challenge Cup at Belfast, and afterwards, becoming the property of the Prince Consort, was put to the plough at Windsor, where he died when past the age of seventeen years.

Contemporary with Mr. Watson was Mr. Bowie, Mains of Kelly, who established a herd of Angus polls within a year or two of the founding of the Keillor herd. This herd, continued by Mr. Bowie's son, stands out in the history of the breed as the source of some of the most influential sires in other distinguished herds, including those of the Earl of Southesk, at Kinnaird Castle, and Mr. Wm. M'Combie of Tillyfour in Aberdeenshire.

The breed made very substantial progress in Scotland until 1859 and succeeding years, when some of the most famous herds of the day were wiped out, or greatly weakened, by outbreaks of Foot and Mouth disease and Pleuro Pneumonia. While these serious circumstances set the breed back its merits have become sufficiently recognized to insure its ultimate success. It is impossible to give more than a very few names of men who were prominently associated with the history of the breed. Messrs. Mustard, Ruxton, Ferguson of Kinochtry, Scott of Balwyllo, Aylmer, Pierson, Lyall, Arch'd. White of Scott, Col. Delgairns and others have all contributed their well directed energies in the history of progress of the Angus. Then there was Robert Walker of Portlethen, Wm. Fullerton and others in whose herds famous bulls came to light. In Mr. Walker's herd, founded in 1818, there was bred the celebrated 'Fox Mule—305.' The building of Mr. Walker's stock was assisted by 'Banks of Dee—12,' 'Andrew—8,' calved in 1847, the sire of 'Young Andrew—9,' one of whose sons, 'Raglan of Portlethen—208,' took 3rd honours at the great Paris Show in 1856; where the second prize was adjudged to 'Marquis—212,' bred by Hugh Watson; the 1st prize to M'Combie's 'Hauton—228' bred by Alex. Bowie,' and described by Mr. M'Combie as one of the fortunes of his herd. Historians of the breed refer to many other worthy breeders among whom was George Brown of Westertown, Fochabarr, who gave distinct evidence of a power if not indeed amounting to that of a genius. He carried a mental type to which he worked towards an ideal. Unfortunately, when he had built up a grand herd, famous for its show ring victories, it was by an outbreak of Pleuro Pneumonia reduced to seven head, with which he again set to work and raised up a second herd quite equal to the first that was dispersed in 1874, the year of his death.

A history of the Aberdeen-Angus breed, however brief, would be very incomplete unless it contained some reference to the work of Mr. M'Combie. After being a few years associated with his father's great business in the cattle trade he, in 1830, founded an Angus herd that had a brilliant career until dispersed in 1880, a few months after his death. Mr. M'Combie was a strong believer in pedigree, particularly emphasizing the ancestry of a bull. He did not depend upon the breeding of a bull even though he was a good individual. Before being generally used on the herd he had to prove himself a thoroughly good sire. In no case would this famous breeder part with a satisfactory sire until he had finished with him. He possessed clear opinions how far it was advantageous to resort to in-and-in breeding of which he wrote 'it may be pursued for a time, but continued to a great length is against nature.' Theoretically he thought that by prolonged in-breeding good quality was maintained or improved, but size was reduced and constitution enfeebled. Mr. M'Combie gained most distinguished honours at the great French Show at Paris in 1856 and 1878, at Poissy in 1857, and at Paris Fat Stock Show in 1862. His champion groups of 1856 and 1878 especially showed superlative excellence.

It was in 1842 that the collection of pedigrees of Aberdeen-Angus cattle was commenced. Nine years later a disastrous fire wiped out the whole of the collected materials. In 1857 the work was again taken up and volume 1 made its appearance in 1862. The demand for the volume was small, only 44 copies being subscribed for. It was ten years before the second volume came out, then came volumes three, four and five, in 1875, 1877 and 1879, respectivly. Then came the organization of the Polled Cattle Society, who commenced a new series of the Herd Book, which was published as Vol. 1, new series in 1881. The book commences with 'Old Jock' of the bulls and 'Old Grannie' of the cows, both numbered 1, and bred by Hugh Watson of Keillor.

From the organization of the association the interests of the breed advanced rapidly, until in Volume No. 32, published by the Polled Cattle Society of Scotland, in 1907, there are registered 1,162 bulls and 1,674 cows and heifers, bringing the total bulls up to 27,662 and of cows and heifers up to 43,173. Simultaneously pedigree registration had been going on in this continent. The American Aberdeen-Angus Breeders' Association in 1886 issued Volume 1, containing 5,200 entries. This association up to March, 1909, had issued 18 volumes of the Herd Book containing the pedigrees of 124,500 animals.

Aberdeen-Angus cattle were first recorded in Canada in 1882 by the late Henry Wade, secretary of the Ontario Live Stock Associations at that time. Registration went on without interruption for two years when all pedigrees and other manuscript prepared for publication were destroyed by fire. Following this disaster many Canadian breeders cast in their lot with the American Association, others continuing to record at Toronto. In 1906 the present Canadian Aberdeen-Angus Association was incorporated under Dominion Act. The rules of entry were made to correspond with those of the American Association, with the additional requirement that all living animals not recorded in the American Record be inspected. The work of inspection was carried out in 1906 and 1907 by Mr. James Bowman of Guelph, Ont., who was nominated by the Canadian Association. The cost of inspection was defrayed by the Federal Department of Agriculture. The first volume of the Herd Book, containing the pedigrees of 2,693 animals, was closed early in 1908. Up to the end of 1909, 1,118 additional pedigrees had been recorded.

The Breed on this Continent.

Comparatively few Angus herds had been established outside of Scotland prior to 1870, but ten years later the breed was to be found in large numbers not only in England and Ireland but also in Canada, Australia, the United States, and a number of European countries. To Professor Brown, President of the Ontario Agricultural College, is credited the first importation of the breed to this continent. That was in 1876, when a bull and two females were added to the farm stock of the College. The records of Prof. Brown's experiments show that the Angus held its own well as compared with Shorthorns, Herefords and Devons in the important respects of feeding, milking, and early maturity. Soon afterwards herds were established by Mr. Whinfield of Quebec, Hon. J. H. Pope, M. H. Cochrane of Hillhurst, John Gray of London, Mossom Boyd of Bobcaygeon, and other well known Canadian breeders. At this time the breed was making even greater strides in the United States, where there are at the present time probably a thousand breeders of the Doddies.

In Canada the breed is spread from Prince Edward Island to British Columbia. One of the best herds of the day is to be found in the 'Garden of the Gulf'; and there are many fine herds in Ontario. In the west one herd consists of upwards of five hundred head, and there are many herds in Manitoba, Saskatchewan and Alberta, ranging from 20 to 40 animals.

Characteristics.

The Aberdeen-Angus is almost wholly black. Other colours, including brown, red and white markings, which were common in the early years of the breed's history, have become rare. The head, comparatively small in proportion to the size of the body, is hornless, and has the tapering top somewhat of sugar loaf form as seen from the front—characteristic of the polled breeds. The head across the eyes is broad while the lower part of the face is of medium length, with features terminating in a comparatively broad muzzle and flanged with widely expanded nostrils. The whole facial expression is refined and full of character, indicative of careful breeding. The ears, which are alertly carried, are of fully medium size and well clothed with hair. The general contour of the body is fittingly described by Wm. Housman in 'Cattle Breeds and Management' in the following language:—

'In harmony with the refined moulding of the cow's head and face, is the elegance, scarcely absolute lightness, but rather neatness, of the throat and fore-part of the neck of the high-class cow. The head is indeed very prettily set on, and between the thick beefy part of the neck next the body, and the head the tapering throat enhances the gracefulness of the animal's style. In the bull, the muscle of the neck, big and rounded, rising from the shoulder gradually to the top of the arch, whence the outline descends to the head, gives a stout masculine character. The female, according to her posture, has the line of the neck more or less nearly horizontal from the shoulder-top to the head, which is sometimes carried stylishly high as she walks, but more commonly at ease neither elevated nor drooping. On the whole, there is much of that which is aptly enough termed smartness or gaiety, in the character and carriage of the breed, without any excess of it in the direction of undesirable restlessness; neither is it enhanced by height. The body indeed is deep, but the legs fine in bone, being also short, do not raise it high from the ground, and the fully proportionate length of frame, and the roundness of the rib, reduce the effect of the depth of side. The animal consequently looks smaller than its weight proves it to be. The shoulders and hips, in the best representative specimens of the breed, are smugly laid in and covered, the crops and loin thickly packed with solid flesh, which is continued over the hind quarters, but not so thick as in some other breeds. It is not that there is a want of muscular furnishing from the hip to the tail, but that the flesh on the hind quarters is so free from superfluous fat as to slope off smooth and rounded into the thick and heavy thigh without break or distinguishing line. The body, therefore, perhaps as nearly approaches to the form of the proverbial gun-barrel as that of any other breed. The deeply covered neck-vein, the thick leaf of flesh under the floor of the chest, extending between the fore-legs to the brisket, and the ample substance of flank, twist and thigh, also show the generous tendency to make flesh on every part of the frame which has no bone in its structure.'

In fat stock show competitions the Aberdeen-Angus has maintained a prominent place in both live classes and block tests. Year after year it has had to be reckoned with in international and national championships, which have frequently been won by the pure bred or the grade Doddie. This has been true not only at the shows of Great Britain, but also at the Chicago International and Canadian Winter Fairs.

THE HEREFORD.

The Hereford, like the Devon, each named from the shire in which it was originally found, was evolved from the native cattle of the south and west of England. These cattle were generally dark-red or brown in colour and like the Devons of to-day active and sprightly in appearance. The present colour markings of the breed are attributed by some to Lord Scudmore's importation from Flanders prior to 1671. Others claim it was due to a white faced bull, brought down from the Tees Valley or Shorthorn country in 1760 by Wm. Galliers. It is probable that this bull besides imparting his own markings to his progeny, also helped to increase the size of the cattle.

Herefordshire, being fertile and well watered, has rich nutritious pastures which would account to some extent for the increase in size of the breed. Early in the 18th century the Hereford cattle were esteemed as superior oxen for draught purposes. They worked well till even fifteen years old and then fattened. They also had acquired the tendency to fatten readily and were quickly picked up by graziers who took them nearer to London and other cities where they were finished for the block. Marshall, writing of the breed in 1788 says: 'I have seen three year old heifers of this breed very fleshy, much fatter than any heifers of that age of any other breed, the spayed heifers of Norfolk excepted.'

The first breeder of note to undertake the improvement of these cattle was Benj. Tomkins, Jr., who commenced in 1770 and continued till 1819. Benjamin Tomkins, Sr., Tully, Knight Skyrme and Galliers were also prominent among the early improvers of the breed but to Benjamin Tomkins, Jr., really belongs the credit of bringing their merits before the public.

Following Tomkins and using his stock as a foundation to build upon, came John Price of Ryall. He at first attempted to increase the size of his cattle by using larger sires from the herd of Mr. Walker. The cross, however, proved unsatisfactory and having disposed of all the animals so bred he returned to the pure Tomkins strain. Mr. Price continued to breed Herefords till 1841, so that for seventy years the Tomkins [illegible] were bred continuously without the introduction of outside blood.

Both Tomkins and Price, like the improvers of other breeds at that period, followed a system of very close in-breeding. This system reduced the size of their cattle but produced animals of superior quality, smooth in outline, fine in bone, and comparatively easy to fatten. As a natural consequence too, of the intensification of blood lines, their progeny became very prepotent. Neither men paid any attention to colour. Tomkins had three well marked colours in his herd. The Pigeons were either gray or roan, the Mottles were so called from their mottled faces while the Silvers were red with white markings, much like those of to-day. One of his favourites, 'Silver Bull—41' was of this later strain but he considered his others equally good. The present uniformity of colour and markings are largely due to the efforts of Jno. Hewer, one of Price's contemporaries. It is doubtful if he would have been successful but that his rival's cattle were sold to go out of the country while his own were kept at home. His practice of hiring out bulls also had much to do with the final predominence of his favourite colour, red with white markings, as we have it to-day. He did much also to improve the size of his cattle. His aim was to produce large animals with as much scale as possible. One of his bulls, 'The General' weighed, when full grown, 3,640 pounds.

Unlike the Shorthorn families that are named from the dam, the great families of Herefords are named after the sires. This does away with so many small families The three principal ones are the Lord Wiltons, Anxieties and Grove 3rds.

'Lord Wilton' (4740), was bred by Wm. Tudge of Adfordton in the year 1873. His sire was 'Sir Roger,' dam 'Lady Claire' and he had the blood of the great bulls, 'Sir Benjamin' and 'Carbonel' twice over combined in his veins. This bull proved a phenomenal sire in different herds. 'Anxiety' (5188) was calved in 1876, the property of T. J. Carwardine of Stoctonbury. His sire was 'Longhorns' (4711) and his dam the celebrated prize cow 'Helena.' This bull was afterwards brought to Chicago, U.S.A., where he sired among others 'Anxiety 4th.' The Anxiety family came from one of the best bred herds in England. Between the years 1873 and 1883 Carwardine cattle won more prizes than any other herd in the land. 'Grove 3rd' (5051), was bred by Benjamin Rogers, 'The Grove' in 1874. He was sired by that excellent bull 'Horace' (3877) and out of the cow 'Blossom' by Sir Thomas, grandsire of 'Lord Wilton' and thus connected with the famous 'Sir Benjamin.' 'Grove 3rd' had no superior, if an equal, as a sire of prize stock.

As early as 1817, twenty-nine years before the first volume of the English Herd Book was established, Herefords were taken to America. Three small importations followed but it was not till 1860 when F. W. Stone of Guelph, began to import that any number of these cattle were brought into the country. Since that time the breed has made steady progress especially in the range country of the west.

About the end of the 18th century Herefords were large-framed, coarse boned animals with heavy front quarters and invariably short, light hind quarters. Before this time and for years after they were bred for milk production and draught purposes. This latter purpose was largely the cause of the extra development of front quarters.

Of late years the aim of the breeders has been to raise cattle with lighter, finer front quarters and longer better fleshed hind quarters. The rather prominent hooks of the past are now quite smooth and the distance between is much less, while the loin and ribs are well fleshed. Next to the Angus the Hereford comes nearest to the egg-shaped, rear-end conformation and finish.

In the time of Tomkins and Tully the colours were roan, gray or red with white markings and even to-day the Herd Book does not call for any standard colour, but red with white markings as described in the scale of points is the colour preferred by the great majority of breeders.

Slowly but steadily the 'Bald Faces' have made their way among the other breeds. They readily adapt themselves to varying conditions and changes of climate being equally at home in the cold northern or warmer southern ranges or in the stables of the east of this continent. As a breed they are hardly as large as the Shorthorns yet individuals have weighed as much. They are excellent feeders, but under long continued heavy feeding they are inclined to become patchy. However, it is for their grazing qualities that they have always been famous, not only in their own shire but over the United Kingdom and later over the plains of the Great Northwest of America. On the ranches they rustle well and are able to do without water for a long time. Another trait that is particularly noteworthy is the care the dams take of their calves; never leaving them to the attacks of wild animals.

The meat of the Hereford is tender and juicy and well marbled but rather coarser in texture than that of the Galloway. The milking properties, once fairly good are now much impaired through the way they have been managed. On the ranches they usually milk long enough to raise a calf well but they are easily dried off and rarely have any udder troubles—traits that commend them particularly to the rancher.

They are good breeders, often breeding to an advanced age even when subjected to high pressure feeding. When used on the common stock of the country Hereford sires impart, vigour, size, grazing and fattening qualities to their progeny.

Pedigree registration on this continent has reached high numbers, more especially in the United States where thirty-three volumes, containing the pedigrees of some 325,000 animals, have been issued. In Canada registration commenced about 1880, but it was not until 1899 that the first volume of the Herd Book was issued. Since then five books have been completed, and up to the end of 1909, 9,329 pedigrees had been registered.

THE GALLOWAY.

By David McCrae.

The district known as Galloway, in the southeast of Scotland, and now comprising Kircudbright and Wigtonshire gave its name to the hardy, hornless breed of beef cattle that have for many centuries been bred in considerable numbers on the uplands and rough pasturage of the district. The true Galloway is a hardy, well-shaped, profitable beef animal. Its body is long, deep and round; back straight and broad; leg short and stout; foot large; the coat of hair shaggy and black, with often a brownish tinge. Of all the hornless breeds, it has the oldest record. In herds it can be fed and handled like a flock of sheep, when carefully and kindly treated.

Much has been written about the origin of polled cattle; scientists have claimed one or other of the wild breeds as their progenitors. How or when the first were domesticated is unknown. Whether or not Jabel, the father of such as had cattle, had polled cows amongst his first herd, is not known, but it is known that polled cattle were described by Heroditus who wrote over 2,300 years ago. Heroditus says that the domestic cattle of the Scythians were without horns. Galloway was early

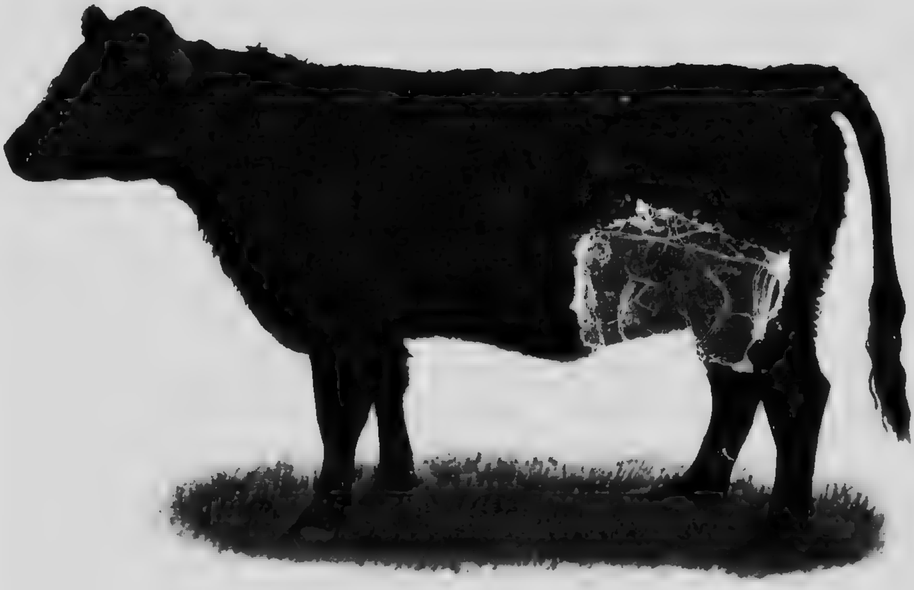


Fig. 17. Galloway two-year old Heifer, "Jane Seaton.'

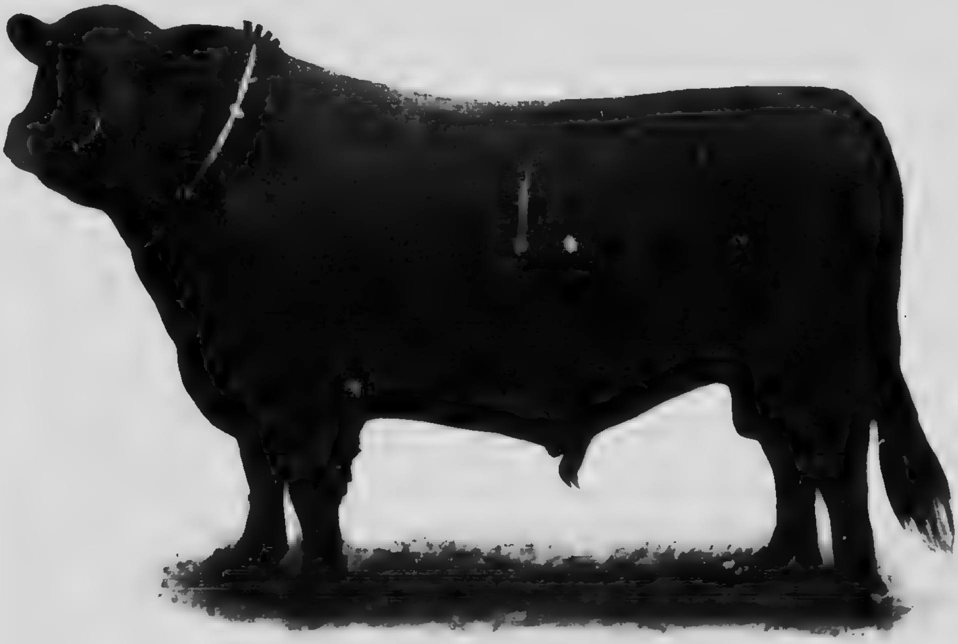


FIG. 18.—Galloway Bull, Chancellor of Ballyboley, Champion at the Show of the Royal Agricultural Society of England.

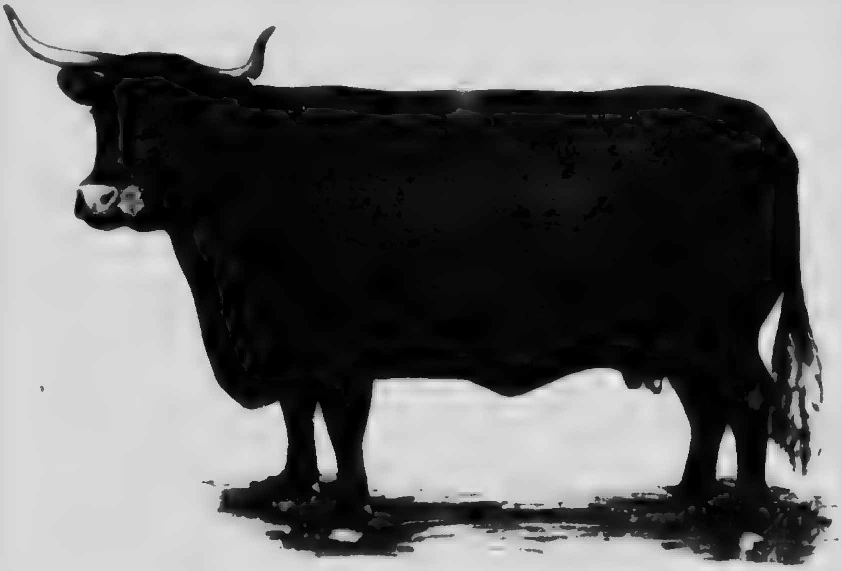


Fig. 19. Devon Cow, "Wimple Kitty."

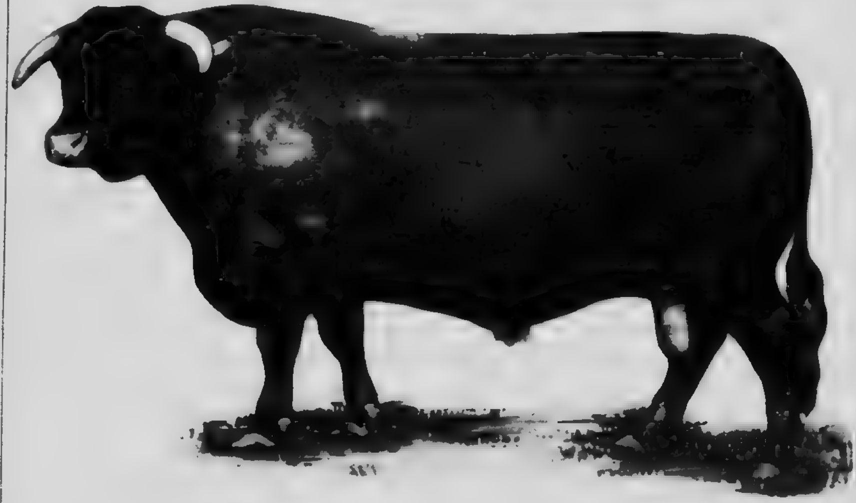


Fig. 20. Devon Bull, "Capton Plough Boy."

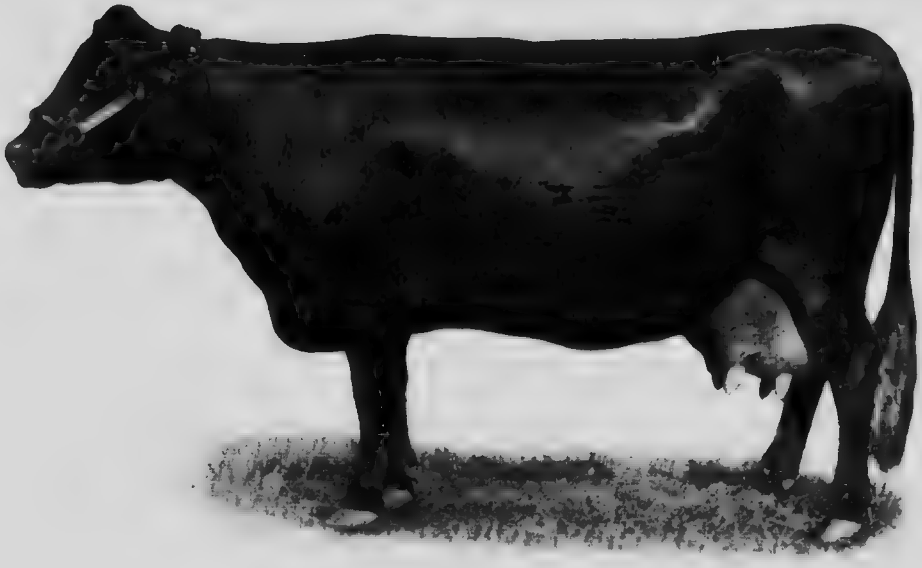


Fig. 21. A winning Red Polled Cow at English shows.

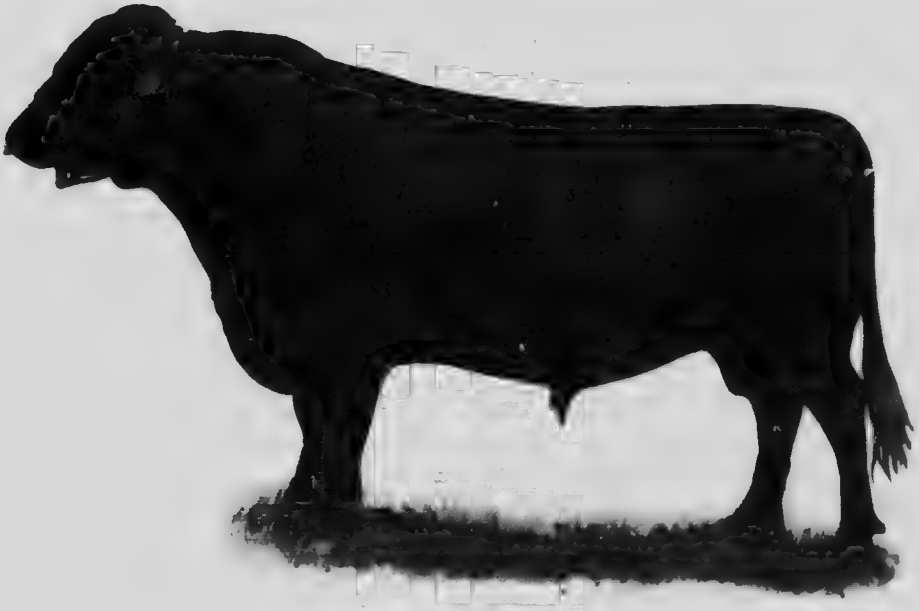


Fig. 22. Red Polled Bull.

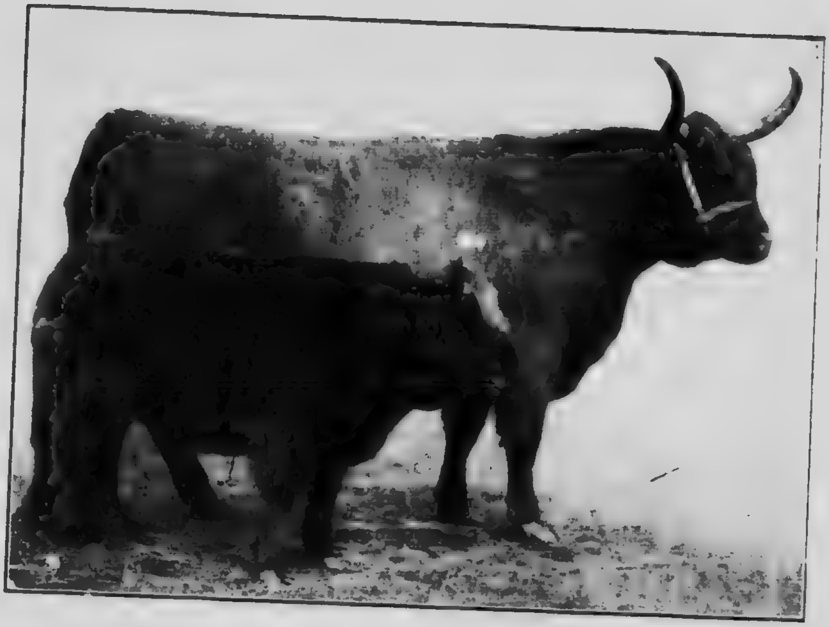


Fig. [illegible]. Champion Highland Cow at the show of the Highland Society.

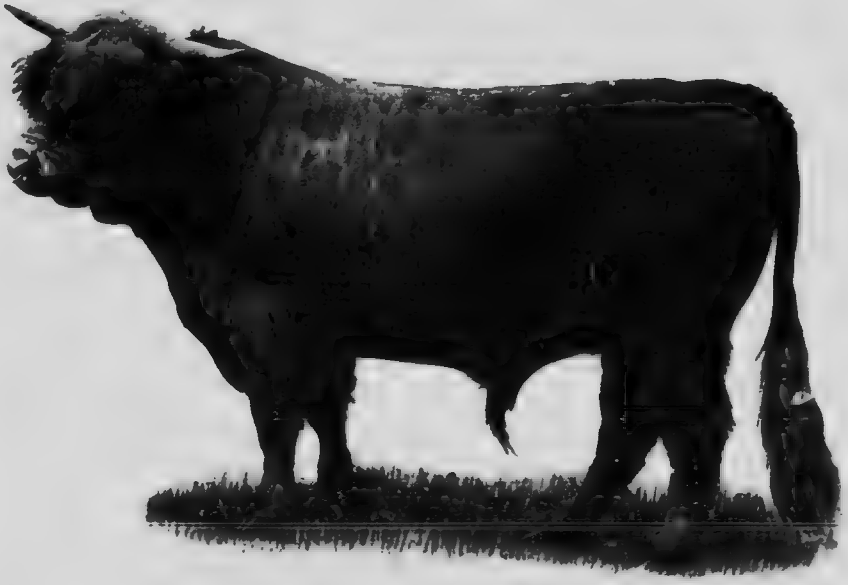


Fig. 24. A West Highland Bull.

inhabited by the Picts, and Bede, one of the earliest English historians, known as the Venerable Bede, says: 'The nation of Picts, coming (as reported) out of Scythia,' what more likely then that from Scythia they brought their hornless cattle, and that these were the progenitors of the modern Galloway breed. Long before the union between England and Scotland considerable numbers of Galloway cattle were taken south to be fatted on the richer pastures of England. Their beef, of excellent quality, mottled and marbled, the fat and lean intermixed, gave them a famous name in the old days. In 1723, the author of 'A Journey Through Scotland' says he saw a thousand bullocks grazing in one park in preparation for the markets in Norfolk and Suffolk. Dairying and cheesemaking have invaded the old home of the Galloway, and it would now be hard to find a flock of a thousand in that section. They are still in the front of good beef-producers and at the Smithfield and other fat stock shows have taken a good place. A Galloway steer was recently returned as the Grand Champion of the Smithfield Show.

A considerable importation of Galloways was made in 1853 by Messrs. Graham of Vaughan, York county, near Toronto. Records were not kept by the Board of Agriculture till 1872. The descendants of that first importation are still numerous, and good enough to yet win in our larger shows. Geo. Miller, Markham; John Snell, Edmonton, Ont., (now Snelgrove); Wm. Hood and Thomas McCrae of Guelph, were also early and extensive breeders. The latter made many importations, and so far-reaching were his sales that, at the recent sales at the International Show, in Chicago, 1909, every animal but one in the scale was traced to stock at one time in this Canadian herd.

In 1871, J. N. Smith and R. B. Caruss, of Michigan, came to Canada and purchased herds of Galloways. Shortly after, Peter Davy, of Wisconsin; M. R. Platt and A. B. Matthews of Kansas City, and J. McHardy of Emporia, Kansas, bought herds and the descendants of these animals are now widely scattered over many of the United States. The latest success of the Galloways is that of the United States Government Farm, in Alaska, where, after a trial of several breeds, the Galloways have been selected as the best fitted for that northern post, and they are now using them for dairy purpose, as well as for beef animals.

Galloways are naturally polled. So marked is this polled character that the produce of a pure-bred Galloway bull with any other breed of horned cattle almost invariably gives polled calves. No other breed of polled cattle will equal the Galloway in this respect. Galloway cows crossed with a white Shorthorn bull produce the celebrated 'blue-greys,' the most famous feeding animals in that land. From this cross all animals are fed for the butcher. They not only feed economically but produce the highest quality of beef.

All improvement of the breed has come from within, by careful selection, and in recent years the advance in quality has been marked. Attempts at improving by crossing with other breeds, which have been often tried, have all failed. In the Canadian west, Galloways have been used for crossing native cattle, grades and others, with marked success. Their size has been quoted against them, as they look much smaller than the Shorthorn. They weigh much heavier than they look, and are always a first-class butcher's beast when ready for the block. The late Mr. Andrews, of the Crane Lake Ranching Company, reported that the steers from his Galloways weighed more in Winnipeg than those from his Shorthorn bulls. This he ascribes to their better rustling qualities. The Galloways he said, were always first out in the cold winter days, and the last to return to the bedding-ground. They are much the hardiest of all the beef breeds, and should be splendidly adapted for our extreme northern pastures in the great west.

Though Galloways are the oldest of the pure bred breeds of British cattle, their Herd Book records are very modern. Unfortunately all the papers and documents which had been collected relating to the breed, as well as the pedigrees, were lost by the fire which destroyed the Highland and Agricultural Society's Museum and Records in Edinburgh, in 1851. Since that time a new book was begun, and the first volume of the Polled Herd Book was published in 1862. This was compiled and arranged by Mr. Edward Ravenscroft, and contains pedigrees of animals of the Polled Aberdeen-Angus and Galloway breeds. Few of the breeders of Galloways joined in it. In 1878 the Galloway Cattle Society published its first volume of Pedigrees, arranged by the able secretary, Rev. John Gillespie, D.D., of Mouswald Manse, Dumfries. No pains were spared to make this Record full and complete. Several volumes have followed since that time.

Registration in the United States was commenced in the early eighties. Seventeen volumes of the American Galloway Herd Book containing upwards of 30,000 pedigrees have been issued.

Registration for the breed is now carried on in Canada under the National Records system. It was begun by the Agricultural and Arts Association of Ontario who published the first volume of the North American Galloway Herd Book in 1883 containing over 1,300 pedigrees. After this the Canadians joined for several years in the American Records but are now recording in Canada for the second volume of the Canadian herds.

THE DEVON.

The Devon, although a beef breed, demands recognition for its excellent dairying qualities. A quarter of a century ago there were more Devon herds in Canada than at the present time.

The home of the Devon is the counties of Devon and Somerset in the south-western corner of England. It is an ancient breed being descended, it is believed, from the smaller type of aboriginal cattle of Britain. The early English records show that the cattle of Devon were of much the same general type and colour as the present animals of the breed. As early as 1776 improvement is said to have been commenced. Francis Quartly did much to raise the standard of the breed. Previous to that time a demand for the cattle of Devon led to a depletion of the best specimens until pronounced deterioration had set in. Mr. Quartly with his son recognized this and not only refused to sell their best animals but purchased wherever possible the choicest individuals to be found. The result was not only a herd of excellent cattle, but others were induced to adopt the same plan until the breed had surpassed its previous highest standard. Early in the following century many herds of excellent cattle were to be found throughout the two countries.

The Devon is possessed of much individuality. In colour it is pronounced red, the shade varying from light to dark. White is permissible only about the udder of the cow and the scrotum of the bull and not beyond the navel or outside the flanks in either case. The hair surrounding the eyes and muzzle is of creamy tint and the muzzle flesh coloured. The head is lean, and clean cut possessing a refined appearance suggesting aristocratic breeding. It is crowned in the cow with a pair of shapely horns which are long and evenly turned up and of a waxy colour, tipped with a darker shade. The horns of the bull are stout and grow almost straight out from the head being only slightly inclined forward in any case. As in the cow the horns of the bull are strikingly matched. The neck shows refinement with trim head and body attachment. The body is medium in size, of blocky form, having well sprung and deep ribs and excellent heart girth. The legs are small and neat. In general form the Devon is stylish and its movements quick and graceful. It is a high mettled breed and possessing weight and stamina is highly favoured as oxen for working purposes.

The Devon is only medium in size being smaller than other beef breeds. Mature cows weigh from 1,000 to 1,300 lbs., bulls 1,800 to 2,000 lbs., and three-year-old steers, well fattened, about 1,200 lbs. The steers in Canada would be classed as butchers' rather than exporters although they kill out extremely well and yield an excellent carcass. In England two types are kept, one tending to beef the other to dairy formation. The former sort has won high honours at the Smithfield Show in competition with other breeds. The majority of the cows, excepting the thickest types, milk well giving a good quantity rich in fat. In the writer's early days a Devon cow 'Red Rose' (No. 607 Can. Record), a matron of a very good herd kept upon the home farm, gave an overflowing pail of milk twice a day during most of the summer. Official milking tests of the breed have not been reported, but 300 lbs. of butter a year is named by an extensive breeder as the produce of the average Devon cow kept under ordinary farm conditions.

Realizing the commendable qualities of the Devon it is remarkable that the breed has not made greater progress on this continent. Even at the largest live stock expositions few animals of the breed are ever shown and these are seldom brought out in such a condition as to indicate enthusiasm in their owners. Perhaps it is that they have not been taken hold of by pushing men prepared to accept the challenge of breeders of other sorts with a determination to win due recognition.

The recording of pedigrees was commenced in England about 1848 and in 1851 a Herd Book was issued. The first volume prepared by Colonial Davy was succeeded by six others, the last of which appeared in 1881. The year previous the Devon Cattle Breeders' Association organized and soon after took over the work of registration. The organization up to 1908 had issued thirty-one volumes of Davy's 'Devon Herd Book,' bringing the number of registrations up to 6,244 for males and 22,473 for females. Registration on this continent commenced in the sixties. The first volume of the American Devon Herd Book was published in 1863, since when seven volumes have been published, bringing the registration up to some 9,000 for males and 15,000 for females. A Canadian record for the breed was opened by the late Henry Wade at Toronto about 1868, but, owing to the small number of breeders in this country and the destruction by fire of a large number of pedigree records a volume was never printed.

THE RED POLLED.

The Red Polled comes nearer to the dairy type than any of the foregoing breeds. It possesses, however, qualifications that entitle it to consideration in a bulletin on beef production.

The native home of the breed is the English counties of Norfolk and Suffolk which border on the North Sea. The origin of the Red Polled, recently named by the Red Polled Society of Great Britain and Ireland the 'Red Poll' is not well understood. Some authorities trace it to the Galloway, others to the wild, white polled sore, while others again incline to the opinion that it was derived from the polled cattle of Southern Europe where cattle are possessed of a soft satiny skin similar to representative specimens of the present time. It is definitely known that the present day Red Polled breed is descended from two types or varieties—the Suffolk Polled and the Norfolk Red Polled. The former was noted for its milking qualities while the latter, also fair milkers, possessed more of the beef type. In 1774 Arthur Young, in describing the Suffolk Polled cattle stated that for two or there months a whole herd would average five gallons of milk a day per head, while single animals gave as much as eight gallons. The cattle were small, naturally thin of flesh and were either red, brindled or dun coloured and all were polled. The cattle of Norfolk county are described by early writers as blood-red in colour with a white or mottled face, having horns, small of bone, fattening as freely and finishing as highly at three years old as cattle do generally at four or five.' They were only fair milkers but improvement in this particular was earnestly undertaken by Jones Reeve of Wigton and Richard England of Bingham, who also undertook to evolve a type combining the good qualities of the Suffolk and the Norfolk in the one animal. This was a comparatively easy matter as the central homes of the two classes were only some twenty miles apart. These men bred to produce a solid red colour and in all probability used the blood of the Devon as well as that of the Suffolk, the former to establish the red colour, the later to dispose of the horns. Early in the nineteenth century the name Norfolk Red Polled began to be applied to the breed which possessed dual purpose qualifications. In 1846, according to Mr. Euren, secretary of the Red Polled Cattle Society of Great Britain and Ireland, a uniform breed of well established qualities had been formed. A few years later it had acquired the name Norfolk and Suffolk Red Polled, in 1882 it was shortened to Red Polled and in 1908, as already intimated, it took the name of Red Poll. The Canadian Association representing the breed have not yet adopted the latest English abbreviation.

It was not until 1873 that the recording of pedigrees was decided upon. In October of that year a number of representative men in equal proportion from each country met and drafted a standard description and also agreed that a Herd Book should be established. The following year the first volume appeared. In this and subsequent early volumes were recorded all trustworthy facts to be got respecting the progenitors of the cattle found in herds in the two counties. The early recorded herds were classed as tribes and groups, the first volume giving 25 groups and 233 tribes. These latter ultimately increased to 385 but have since been reduced to two hundred. Each group is indicated by a letter of the alphabet according to foundation stock. For example group 'A' comprises the cows in the Elmham herd and 'B,' the cows in the Biddell herd and so on. Thus 'A' 1 refers to the foundation cow in the Elmham herd, named 'Primrose,' while 'F' 3 'Joan,' is described as a good Red Polled cow in the Honingham Thorpe Herd. In 1887 the Red Polled Cattle Club of America published volume 1 of its Herd Book in which was condensed the first six volumes of the English Book. Subsequent English and American volumes correspond in their registration. Up to 1904 sixteen volumes of the American book had been issued, containing the pedigrees of bulls numbering up to 12,420 and cows 22,238, the animal bearing this latest number being 'Zinnil 3rd' tracing to the eighth daughter of 37 Beauty—W 2, which means that 'Zinnil 3rd' is descended from tribe No. 2 of group W.

The dual purpose type is represented in its truest form in the Red Polled breed. In many respects they resemble the Devon in form of body, but in being polled they present a striking difference in appearance and this is the more impressive on account of the prominent and beautiful horns of the Devon. The head is lean and breedy and presents the characteristic 'sugar loaf' poll. The neck in both sexes lacks the plumpness of the single purpose beef breeds, cows in milk being singularly pronounced in this respect. The withers are only moderately broad and full, but fairly level. The body is deeply ribbed and the back covered with flesh to only a medium thickness. Smoothness characterizes the hips and hooks, while the hind quarters present less thickness and plumpness than the heavier breeds. The udder has not received the attention that has been given to most of the dairy breeds. In many cases it is pendulous and lacks in the fore parts. It is seldom that a fleshy udder is observed and good sized teats are the rule. The colour varies from light to dark-red. While solid red is preferred, a patch of white on the udder or belly and a white tail switch is permissible. The red polled is a high spirited breed but less so that the Devon. In size it ranks much like the Devon but greater weights for bulls reaching in some cases 2,400 lbs. are recorded. Bulls of good type in breeding condition weigh from 1,800 to 2,000 lbs. and cows from 1,000 to 1,300 lbs., the latter being the weight of a show animal.

Red Polls are economical feeders and make excellent beeves, rather of the butcher than export class. Bullocks of this breed have won championship honours at the Smithfield Club fat stock show. On one occasion such a winner dressed out 73·75 per cent of his live weight. In another case a winner at 32 months old weighed 1,708 lbs., having put on 452 lbs. in twelve months. Again it is chronicled that a cup-winning heifer at two English fat stock shows weighed 1,578 lbs. at 33¼ months old. No Red Polls have been shown at Canadian fat stock shows, but at Chicago in 1904 a steer in the two year old class weighed 1,680 lbs. and dressed 1,005 lbs. equal to 64 per cent. It will therefore be seen that the breed may be classed amongst the beef producers.

Red Polled cows are good milkers. Records of from 8,000 to 10,000 gallons per year are not uncommon. At the Pan-American six months' dairy test in 1901, a herd of five cows stood fifth among the breeds showing a net profit of more than two hundred dollars. Among the fifty cows tested 'Mayflower 2nd,' stood second producing 6,161 lbs. of milk, containing 323 lbs. of estimated butter, showing a net profit of $52.10. In fifty-two weeks of 1900-1901, 43 cows in the herd of Lord Rothschild at Tring Park, England, yielded an average of 6,895·76 lbs. of milk. Official reports of tests show that Red Polled cows are good butter cows, the fat test usually running about 3·8 per cent, while higher than this is reached by individuals in almost every herd. At the Iowa Agricultural College, the Red Polled herd of cows gave yearly returns of 400 to 500 lbs. of butter, while at the Ohio College a cow of the breed gave equal to 440 lbs. of butter in a year.

The breeding qualities of the breed are high. That is to say, a male stamps his progeny to a pronounced degree. It is claimed that the red colour and polled heads are the almost invariable rule even in offsprings of the first cross. Other qualities of the breed are equally strongly transmitted.

The distribution of the breed in the United States is wide, extending into nearly all the states of the union. In Canada it is only recently that herds have been established. In the early nineties a small herd was imported by the Ontario Agricultural College and since then the increase of stock has been confined principally to western Canada where in 1907 the Canadian Red Polled Association was organized, soon after which the Herd Book for the breed was opened under the National Records system.

THE WEST HIGHLAND.

The West Highland is a distinctive breed, quite unlike any other sort that we have. It is picturesque to a degree and possessed of a majestic bearing such as might be expected in a breed bred and reared in a rugged country and a bracing climate. The native home of the breeds is the Uplands of Western Scotland, including portions of Argyle, Inverness and Perth Counties and the Hebrides Islands. The breed is believed to have descended from the aboriginal cattle of Britain. Being reared under rugged conditions, and often spare pasture, the Highland is diminutive in size, rough coated and hardy. In colour it is variable, being yellow, red, black, brindle and a mixture of red and black, the former colour predominating. Broken colours are objected to by breeders, although a single herd may show all of the colours named. The hair is long and shaggy when grown out, reaching in many cases a length of six inches. The head, more particularly of the bull, is very bushy and is surmounted by a pair of majestic horns which curve forward and upward with the points wide apart. The horns are white with light colours, and white with dark tips with dark colours. The colour of the muzzle varies from buff or flesh to a dark shade in harmony with the depth of colour of the hair. The neck is sturdy and bulls carry a mane of considerable length and heavy dewlaps below. The body resembles that of the Shorthorn in form, although of less size, the resemblance consisting of a straight back, broad loin, deep rib, and a general squareness of form strongly supported by short legs. The noble branching horns, full and fearless eye, broad muzzle and shaggy coat of solid colour impart a picturesqueness that has made the Highland bull the subject of many an artist's brush. Added to these features his beauty is still more enhanced by a graceful deliberate movement resembling the buck of the forest in his prime and in perfect freedom.

Although small of stature the West Highlander weighs well, cows averaging about 900 lbs. and bulls 1,200 lbs., although larger specimens are seen.

The breed excels in the quality of its beef, the grain being fine and fat is well distributed in the lean tissue; the flavour is superlative and the carcases being relatively thick, dress out well. In the leading British markets Highland beef commands the top price. The breed has not been handled for early maturing, these cattle feed up slowly and bullocks seldom reach the market under four years of age. In hardiness, West Highland cattle are remarkable. Their free life on the Scottish hills, where they graze summer and winter on grass and heather, has developed a ruggedness which enables them to withstand with little inconvenience hardships under which most cattle would succumb.

The first volume of the Highland Herd Book was brought out in 1884, largely through the influence of the Earl of Dunmore. It is issued by the Highland Cattle Society at Inverness, and some ten volumes have been issued.

The breed has not spread to any great extent, although herds have been established in several countries, including Australia, the United States and Canada. Writing some years ago regarding the adaptability of Highland cattle for the ranges of the Northwest the Earl of Dunmore said:—

> My average yearly loss has not been three per cent, which in a large fold of some four or five hundred head of cattle is very small. January, February and March are pretty hard months for them, as they get no food beyond what they pick up on the hills where they are wintered. I have often seen them scraping away the snow to get at the grass; but notwithstanding their being out all winter, they produce in April and May as strong and lusty-looking calves as a man could wish to see, with lots of bone and tremendous thick coats. That, to my mind, is the coming breed for the great northwest ranges.

Herds have from time to time been established in Canada but these have not been perpetuated for many generations. There are, however, in use a number of Highland bulls in ranch herds of Alberta, where they are especially adaptable, owing to their vigour which enables them and their offspring to withstand the occasional severe periods to which range cattle are subjected. The Highland bull is a prepotent sire, and there is no mistaking his progeny in a herd of mixed breeding. They have invariably, squarely built frames, thick middles and are close to the ground.

THE BREEDING HERD.

A stream cannot of itself rise higher than its source, neither can cattle of superior quality be looked for from a herd of ordinary breeding and inferior type. To the man who would undertake the breeding of beef cattle it is of first importance that the foundation of his herd possesses the qualifications desired in the offspring not only in regard to breeding and type but in vigour and disposition as well. In an earlier section of the bulletin the ideal beef bullock is described. In that description the requirements of the breeder and feeder as well as those of the butcher have due consideration. If the utmost success in the raising of beef cattle is to be attained too great care cannot be exercised in the selection of foundation females and the choice of sires to be mated with them. No argument is required to convince the intelligent stockman that the beef breeds must be adhered to. That is to say the females should afford evidence of blood of one or other of the beef producing breeds and the more of it the better. Beef from dairy bred animals is not only inferior in quality and therefore of low value but it is produced at too great a relative cost. For hundreds of years the beef breeds have been reared to produce first meat and secondly milk. In a beef herd we want the maximum of the former and as much as is practicable of the later. What is wanted is 'motherly' looking cows, not too compact in conformation, and possessing that femininity of appearance that is so conspicuous in the matrons of every thoroughly successful herd. A coarse 'steery' headed female is seldom a successful breeder. Although she may yield a calf each year, her stock is not likely to possess the high qualities that one expects from the high class sire that should head every herd and is worth paying a good price for. Having the nucleus of a herd of the desirable type it is all important that a thoroughly impressive sire be placed at its head. The stock raisers of the Argentine have lessons to impart to many Canadian cattle raisers. Even for the raising of steers no price seems to them too high to pay for a sire of the best kind. Their wisdom is shown in the price received on the British market for chilled and frozen beef which is often equal to that received for fresh killed Canadian cattle. The bull then to head a beef herd should possess the qualities desired in his offspring and have the unfailing power of transmitting them. This power is indicated in two ways, first by his pedigree, and second by his masculine, courageous, vigorous appearance and demeanour. In addition it is of first importance that he possesses the desirable qualities of a beef animal described in an earlier section under the heading 'The Beef Bullock.'

Beef raising is carried on throughout Canada by two general systems of farming. Under one system the cows are milked and the calves reared largely on skim milk with supplementary foods. Under the other system the cows rear their calves which usually run with them constantly until weaned. In other districts when land is high in price and where mixed farming is carried on, the most has to be made of the milk, while the newer sections, including ranching districts, and where help is difficult to obtain, the cow must pay for her keep only through her offspring and in the end her carcass. In the former case it is all important that the cows be copious milkers, while in the latter it is sufficient if each gives enough for her calf, or if especially good, she may raise her own calf and that of another cow. The method of establishing a breeding herd is therefore divided and treated under two separate headings. The following article by Dr. A. G. Hopkins, in charge of the Health of Animals Branch in the province of Saskatchewan, deals with the general purpose herd, while the special purpose beef herd is dealt with farther on by Mr. Geo. H. Greig, the representative of the Live Stock Commissioner in Manitoba, Saskatchewan and Alberta.

ESTABLISHING A COMMERCIAL HERD OF GENERAL PURPOSE COWS.

By A. G. Hopkins, B. Agr. D. V. M., Regina, Sask.

It may be asked why give this variety of cows, which some would have us believe are no-class, the prominence and attention suggested in the above heading? Several reasons may be adduced, the two most important being (*a*) the suitability of this type of cow for the needs and conditions of many farmers and (*b*) the care and knowledge necessary to secure them.

Under section (*a*) are to be included the moderate sized, valuable farms of Eastern Canada, whose occupants have no wish to devote themselves solely and entirely to dairying, but who wish to carry on a more interesting, less exacting, and perhaps quite as profitable a system, all things considered, of farming, with the added advantage that by the several lines of agriculture they endeavour to engage in there is less likelihood of loss from market glutting and depreciation in prices. Men who keep a few sheep, breed a few horses and who are open to sell some hay or grain when prices are sufficiently attractive, either as the raw material, as milk, butter or on foot as beef, mutton, pork or draught horses, will find the general purpose cow indispensible. Again on the prairie farms of the Canadian west, in the country where it is futile to attempt to divert farmers from growing wheat, the general purpose cow is destined to be the saviour from a situation, which now is depleting soils of fertility, causing the abandonment of swine breeding and making scarce as well, good butter, cream and beef. Space of time will not permit one to detail the misguided efforts of those who seek in one or more generations, as by an Aladdin's lamp to metamorphose grain growers into dairy farmers; attempts where made have been disastrous, leaving in many localities monuments to misdirected efforts in the shape of abandoned creamery and cheese factory buildings.

The general purpose cow can be procured by two methods, and from grade or pure bred herds of cattle, (*a*) by selection (*b*) by breeding.

The first method presupposes in the person making the selection, considerable knowledge of the attributes of a producing cow, and with an open mind as to form and type. While it will not be wise to lay down any hard and fast description, cows of the kind mentioned will be found to be either white, roan, red, or red and white in colour, more frequently the two latter colours, thus disclosing the predominance of Shorthorn blood, will be distinctly feminine in appearance, of moderate size, about 1,100 to 1,350 lbs. live weight, deep chest, comparatively large, not paunchy barrel, fairly thin in neck and narrow at top of withers, with a soft pliable and only moderately thick skin (it is an exception to find a good milker with the thick mossy hide desired on the beef type of animals), and with well developed, tortuous milk veins and large milk wells, a regular shaped udder, free of meatiness, yet a vessel withal unlike a dish rag in its texture or consistency. In addition, whenever possible, the general purpose cow should possess an authentic milk record of yearly production amounting to from 5,000 to 10,000 pounds, and should give an average test of butter fat of four per cent or thereabouts. The solid reds are frequently discriminated against, and experienced handlers will understand why. Whatever the reason, the fact remains that the medium-thick, red hide is rarely as pliable as one should look for, and the thick mellow, red hide usually covers the frame of a poor milker, albeit a good beeve. The dual wedge-shape should be preferred, the top of one wedge at the withers widening as one goes down, the other wedge widening from before back to the hind quarters; and select an udder with the teats spread well apart. This class of cows can at no time be termed 'neat little cows,' rather they are large and rugged with capacious udders and a marked tendency when dry to put on flesh. Grades of this type cost from $60 up, in the Union Stock Yards, Chicago. Occasionally one finds a cow of the type described at farm sales, but the bidding for this kind is always brisk, as the value of such cow is known.

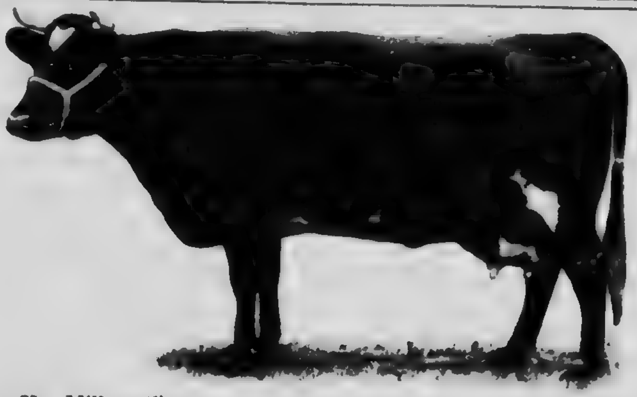


Fig. 25. Milking Shorthorn Cow, "Priceless Princess," gave 8,505 lbs. milk with first calf

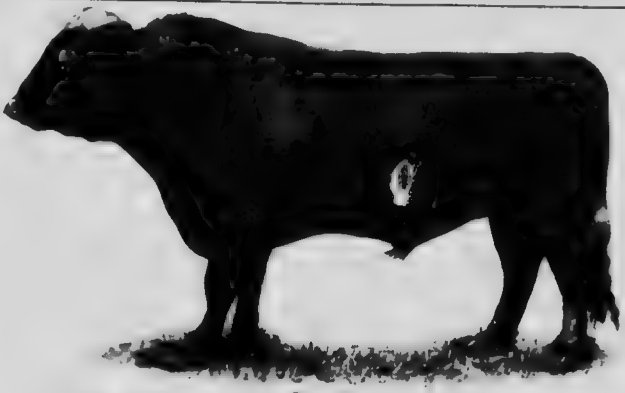


Fig. 26. Milking strain Shorthorn Bull, "Prince Pericles."

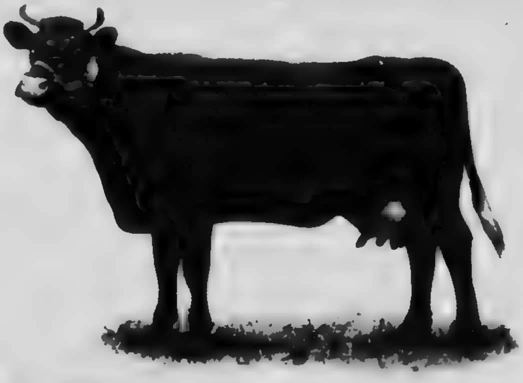


Fig. 27. Milking Shorthorn Cow, "Babraham Darling Lady."

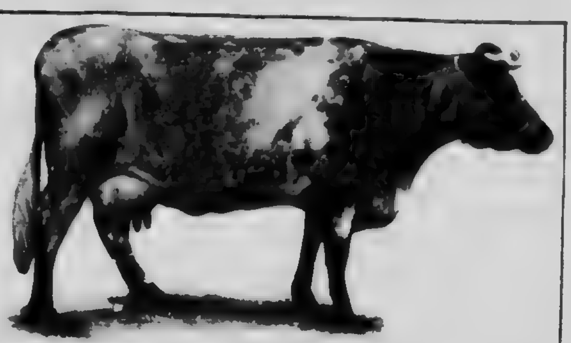


Fig. 28.

Milking Shorthorn Cow "Darlington Cranford." Winner at many English Dairy Shows.

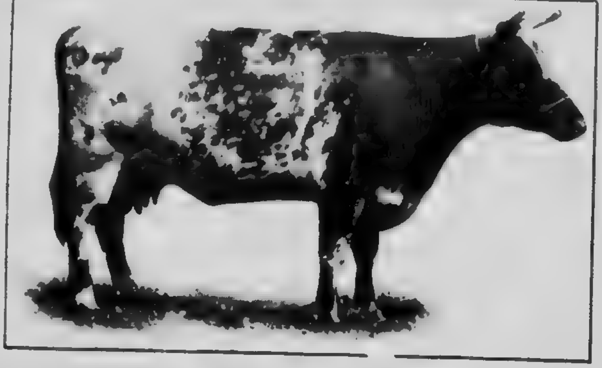


Fig. 29.

Milking Shorthorn Cow "Lulu," owned by the Missouri Agricultural College. Gave 12,341 lbs. milk in one year.

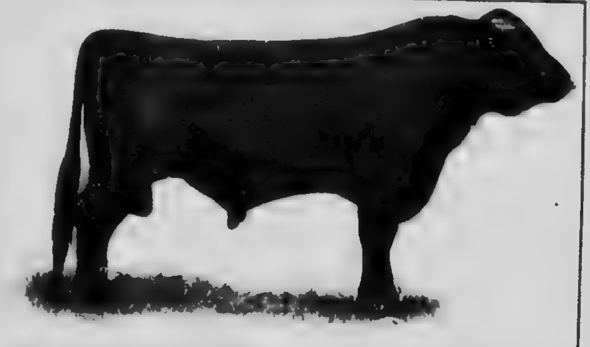


Fig. 30.

Milking Strain Shorthorn Bull "Magna Charta."

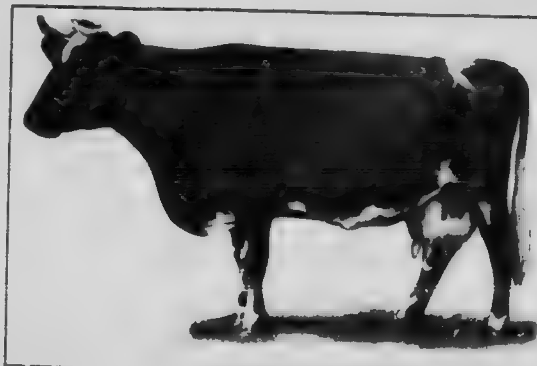


Fig. 31.

Shorthorn Cow "Moppy Gem 2nd."

When one comes to consider the breeding of this type and variety of cows, other factors must be taken into consideration, viz.: the sires to be used, the dams to be bred from and the upbringing of the heifer calves. Incidentally it may be here stated, (whether or not the dams employed for the purpose are pure or grades), the bulls must be pure-bred registered animals, and should be from dams, and if possible granddams, with yearly milk records. This is the most important point in the selection of the bull, after which masculine character, and fidelity to breed type may be considered. No time need be wasted in endeavouring to secure a bull which in form approximates to what is known as the dairy type, (as laid down by the dairy breed exponents), to do so would be to forget two things, first, the milking tendency is largely a matter of habit, training and development; second, the fleshing tendency must be exemplified in the male. No harm can result if the bull possesses well developed rudimentary teats, many breeders rely on these as an indication of ability to beget good milking females. The type of bull required will be most easily found by the general farmer in the Shorthorn ranks, although where herds of Red Polls are to be found, sires capable of transmitting general purpose character may be had, with this difference that in size and in milk yields the average will be less than if a Shorthorn bull is used. Constitution must not be overlooked, and avoid the hard handling kind. When we come to the dams, the necessity for careful selection becomes evident, the thick beefy, masculine or steery headed females must be avoided, or what is gained by the use of a sire from a well marked milking ancestry would be lost or mitigated to an undesirable degree. Females as already described (and illustrated) should be selected and if mated with a pure bred bull from ancestry of persistent ingrained milking proclivities, the results in the progeny will be found to be satisfactory. The male progeny, if pure bred, should be carefully culled and the culls steered, the entires being raised as well as possible, but not allowed to suckle their dams. The heifer calves should also be pail fed and given a diet to induce growth and flesh rather than fat, in fact they should be kept growing until calving for the first time, which should take place as nearly as possible when thirty months old; if calving is postponed long after that time, there will be a tendency to develop fat throughout the system, including the mammary glands, rendering it impossible by subsequent treatment to bring those glands to their greatest activity or fullest capacity; if on the other hand the heifers are bred too early, constitution, size and vigour will be lost, and the ends of the breeder defeated thereby. If possible, the heifers should be mated with a sure mature bull of proved ability to beget good milkers. It should hardly be necessary to state that the attempt to build up a herd of the kind of cows described will be wasted effort unless the heifer calves are properly handled, the heifers and cows milked as long and as thorough as possible and milk records kept—records which should form the basis for culling out misfits. Bran, oats, clover and good pastures, water and salt are the breeders' adjuncts—roots, silage or fodder corn will also be useful, but the fattening feeds must not be used during the heifer's growing or milking days.

The careful observer desirous of building up a grade herd may by taking his time pick up females here and there at farm sales, although for cows of this type competition is always brisk and for bulls he must go, either to the few, very few breeders on the American continent or to Great Britain, where a yearly increasing number of Shorthorn breeders are keeping milk records. In the North of England may be found herds of unregistered (but practically pure bred) dairy Shorthorns; at the Central Experimental Farm, Ottawa, are a few pure bred dairy Shorthorns, (one a cow who in the lactation period following her second calving, produced 10,000 pounds of milk in twelve months), at the Macdonald College, Ste. Anne de Bellevue, Que. is the nucleus of a dairy Shorthorn herd, unregistered; at the Iowa Agricultural College are some dual-purpose Shorthorns; but to see the real article in any numbers the London (Eng.) dairy show is the place. It will not be amiss to quote a few pure bred records made in an English Shorthorn herd.

Countess Babraham, with first calf..	5,668	lbs. milk.
Dora Darlington, in one year..	7,961	" "
Priceless Princess, with first calf..	8,505	" "
Fanny, in one year..	872	gallons.
Fanciful..	937	"
Lucy, eight year average..	7,496	lbs. milk.
Darling 6th, six year average	6,881	" "
Clarissima 2nd, seven year average..	6,070	" "
Ingram's Rose, gave in nine months..	6,745	" "
Norah 6th, in one year..	7,765	" "
Oxford Ada, in one year..	10,299	" "
Lady Crystal Bates, with third calf..	8,845	" "
Hilda's Crystal, in one year..	6,170	" "
Red Pippin, in one year..	7,694	" "
Lady Coquette, with second calf..	5,868	" "
Babraham Darling Lady, with third calf..	6,799	" "
Lady Evelyn Bates, in one year..	5,869	" "
Babraham Lucy, with first calf..	7,361	" "
Jessamine, with second calf..	7,869	" "
Ellesmere Graceful, 4th, in one year..	6,524	" "
Moppy Gem 2nd, three year average..	10,015	" "
Babraham Penelope, with first calf..	6,223	" "
Babraham Daisy " " "	6,660	" "
Carrie 23rd, in ten months..	7,677	" "
Royal Heiress, in one year..	11,641	" "
Princess Raglan, four years average..	7,571	" "

The list above given of twenty-six producing cows from one herd of the type known as general purpose or dual purpose cows, is evidence that the project is feasible, that it is desirable is admitted; the records of the progeny of the above females are very promising and the bulls in use are from heavy milking dams. The following paragraphs from the *Estate Catalogue* give in a nutshell the idea sought for and the method followed to attain that end.

The ancesters of the present herd were purchased in 1896, for the purpose of establishing a herd of Dairy Cows eligible for Coates' Herd Book, the object being to breed heavy milkers, with robust constitutions, which could be easily fattened when discarded from the dairy.

That the cows should yield a large annual return of milk was of primary importance, as a large retail dairy business, was being worked in connection with the herd; this dairy business has since greatly increased.

Shorthorns fulfilling the above requirements being needed, the bulls used on the herd have all been selected from heavy milking cows; the calves are weaned from their dams when only a few days old, hand-reared and brought up in a natural healthy breeding condition.

From the outset every cow's milk has been weighed night and morning, their milk yields carefully recorded, and indifferent milkers weeded from the herd, with the result that at the present time the cows are good milkers and prolific breeders, the heifers calve down with good shaped udders and promise to develop into valuable dairy cows, and the young bulls are sought after by dairy farmers and others who recognise the necessity of using bulls from dams possessing dairy qualifications.

Further the English Dairy Shorthorn Association includes over seventy breeders, the list including some of the most noted herds in the United Kingdom. Doubtless many readers have noted in both pure bred and grade herds, individual cows, heavy persistent milkers, of good size and with a tendency to flesh up when dry; one particular noteworthy grade cow 'Rose' was in the dairy herd of the University of Wisconsin in 1899-1900, and made a record in one lactation period of over 500 pounds of butter. A steer from this cow got honourable mention at the International Chicago, December, 1900.

One cannot do better than reiterate, for the guidance of those intending to establish a herd of general purpose cows, the methods followed in the herd especially established for the purpose some fourteen years ago from which the records above are taken.

In order to fulfil the requirements of a commercial herd, it must be demonstrated that the class of cattle referred to are money makers. In the English herds adjacent to the cities, the milk is sold for human consumption and the dairy business of this kind is considered one of the most profitable systems of agriculture followed. Adjacent to the metropolis, London, a commercial herd of one hundred head of general purpose cows is maintained. The cows are milked for about four years and are then allowed to go dry, are fitted up and sent to the block. Cows of this type are large consumers of roughage (cheap food such as hay, straw, roots) and comparatively small consumers of concentrates (grain, the more expensive portion of the food), consequently are economical producers of milk and butter fat. One of the best pieces of evidence of the value of this type of cow is the continual demand for them at the stock yards, Chicago, from which place they are later shipped to supply dairymen at Buffalo, Pittsburg, Philadelphia, Jersey City. The dairymen at the points mentioned like the 25 to 30 quarts a day cow which when through with milking, can with a little grain and grass be put into such shape that he gets back the money paid for the cow. The general farmer cannot do better than try to breed the type described, whether for sale or for use on his farm; the centralization of creameries and the increase of separators have brought about conditions specially suited to the man with this type of cattle. In the usual farming community there is a very limited demand for veals, hence the special dairy breeds are not the best for any but the special dairyman to breed and raise. Good care, intelligent selection and the keeping of milk records together with the use of Shorthorn sires from heavy and persistent milking dams, will if observed bring the farmer success in his efforts to establish a commercial (which I take it to mean profitable) herd of general purpose cows.

Bullocks from General Purpose Cows.

A fear may be entertained that to develop the milking qualities of beef bred cattle would be to impair in like proportion their beefing tendencies. The flesh yielding characteristics of the dairy breeds would naturally lead to this conclusion, and no doubt breeding exclusively for milk would result in an alteration of type and a general departure from the strictly beef Shorthorn as it is understood in the show-ring. It is only, however, when a breeder utterly neglects the beefing qualities of his herd by making dairying a specialty that he is likely to sacrifice the beefing powers of his herd. The relationship of the heavy milking general purpose cow to the beef bullock is well described by 'Spero' in the *Live Stock Journal* (London, Eng.,) of February 19, 1909, as follows:—

> Let us glance at the dual-purpose cow as she strikes the dairy farmer who is also a grazier, and wishes to turn out some good steers or sell his bull calves to others to rear and feed. Although the exhibitor in the open classes at our shows can rarely win with a heavy milker, it does not follow that the ordinary British dairy farmer, in order to have 1,000-gallon cows, need sacrifice his beef value by breeding light-fleshed cattle approaching the Channel Island type. Let us take a case in point which has just come to the writer's notice. A dealer bought twenty steer calves from Mr. R. W. Hobbs' large herd, bred from cows yielding an average of about 1,000 gallons yearly. They were sold to a farmer in the neighbourhood, reared and fed by him, and sold at last Christmas' markets where prizes are given. Altogether, these steers from heavy milkers won £30 ($146.00) in prizes, and were sold at the average of £24 15s. 3d. ($125.00) each, being about thirty-three months old. The highest price was £31 ($150.00), and the lowest £19 ($95.00). To obtain such results requires much care and skill in breeding. It may be easy enough where beef points are made the chief consideration, but here we have a lot of good farmers' bullocks, bred from unmistakably deep-milking, pedigree Shorthorns, and what is done by one breeder can be done by others.

THE BEEF HERD.

By Geo. H. Greig, Representative of the Live Stock Commissioner in Manitoba, Saskatchewan and Alberta.

The conditions under which the ranching industry have been conducted are undergoing a rapid change, and except under very special circumstances, the day of the 'big ranch' is gone. The settler with his dogs and barb-wire fences, is pre-empting the watering places, and it is no longer possible to run cattle in big herds. Throughout southern Alberta and southwestern Saskatchewan hundreds of thousands of acres of the best grass lands in the world have been furrowed by the plough of the settler; irrigation ditches are carrying moisture over millions of acres of semi-arid territory, and wheat and oats of the highest excellence yield abundantly. So promising is the winter wheat industry that 'Alberta Red' is already a recognized grade of superior quality, and a new outlet to the markets of the world is now being sought via Vancouver and the Pacific. Alfalfa and sugar beets also return magnificent yields. It is not a far cry to the day when large numbers of export cattle will be finished during the winter on alfalfa hay, and the residue of the sugar factories on farms adjacent to the ranges where they are raised.

Notwithstanding the fact that vast areas of territory in these provinces, long considered worthless for agriculture and fit only for grazing purposes, are now being invaded by the homesteader, there is, and will for years to come, be plenty of room for the small rancher as well as for the combined farmer and rancher. Districts remote from railroad, or where the surface is rough and rolling are likely to retard the advance of the settler for many a decade. The climatic conditions are so peculiarly favourable to the economical production of live stock that the industry will in the end not suffer from these changed conditions. In fact the output of beef will increase rather than diminish. The establishment of many small herds will tend to the closer supervision and better care of the stock; better bulls will be used, and a larger percentage of calves will be raised. Provision will be made for winter feeding so that in case of severe storms the losses, if any, will be light.

On the ranch-farm, or farm-ranch, where conditions make it impracticable to milk more cows than just enough to supply the household necessities, the calves run with the cows, and it is therefore not desirable to have cows of highly developed milking propensities owing to the difficulty of giving proper attention to the udders immediately after calving, and until such time as the calf can take care of a liberal supply on its own account. This danger may be more imaginary than real, and, in establishing a breeding herd it is probable that the best females, grades of any of the beef breeds, will be found none too good. However, a man must be governed largely by the depth of his purse, and a good start may be made by shrewd and judicious selections of even very commonly bred females.

Bulls.

Too much importance, however, can hardly be placed on the selection of sires for use on the herd. Bulls of any of the distinctly beef breeds will produce good results. It is well, though, to follow along one line of breeding in order to get as uniform a herd as possible. In selling beef or breeding stock, uniformity of type and colour count. Herefords, Galloways or Aberdeen-Angus are very prepotent and will impress their particular markings very strongly upon their offspring. The Hereford will reproduce on almost any cross the white face and white lines and markings on a body colour of red. While the Galloway and Angus will as surely produce a mooley and nine times out of ten paint him a solid black. The Hereford and Galloway are particularly good rustlers, and the Angus are excellent finishers. It is, however, not so easy to obtain, at reasonable prices, large numbers of bulls of these breeds, that are of high uniform excellence owing to the comparatively limited number of herds in Canada. Shorthorn bulls are obtainable in large numbers, but discretion in selecting them is of no less importance on account of the general popularity and great numbers of the breed. The red, white and roan of the latter breed does not tend to a uniform colour scheme in the herd, but reasonable care in the selection of bulls will result in a uniformity of type. The Shorthorn is a fairly good grazer, and is unsurpassed as a finisher, either off grass alone, or under heavy grain feeding. The blood lines of the bull, of whatever breed may be decided upon, cannot be of too high quality. Select the best breeding you can afford, providing other points are satisfactory. They must be of the beef type with good backs and loins and deep ribs. Two year old bulls are generally preferred and they should be raised under conditions which will have given them plenty of growth and unimpaired vitality. Young bulls kept for months tied up in stalls or even run in small loose boxes floored in manure in warm moist stables, are sure to go off on feet or legs when subjected to any strain. Even the strain of shipping is often sufficient to start trouble. Strong, vigorous, masculine chaps, well conditioned but not overly fleshed, with good coats of mossy hair, are the kind wanted.

The bulls intended for use on the herd, whether few or many, should be run in roomy paddocks, supplied with nourishing food, to fit them for their season's work. During the breeding season if the bulls can be kept up so much the better, the fewer bulls will be required. When run with the open herd, it is estimated that one bull is required with every twenty-five females.

Calves.

Under this system of cattle raising, the cows will be bred to calve late enough in the season to ensure favourable weather conditions for the calf crop. For the balance of the summer, the cows will take care of the calves, but they should be taken up in the fall before the weather gets too cold or they will lose much of their calf flesh. Under farm, or semi-ranch conditions, where the number to be handled is not so large, special care should be given the calves during their first winter, and, even on the large range, the calves should be cut out into separate herds, placed on the most favourable pasture, with some shelter, if possible, provided, when necessary, with hay of good quality, or some green cut oats, and sometimes even uncrushed oats can be fed to advantage. No elaborate equipment is necessary, the hay can be fed in cheaply constructed racks or scattered on the frozen ground. Where the calves are stabled, their quarters should be roomy, clean, always well bedded, not too warm, with a dry atmosphere and good ventilation. No better feeds than above mentioned are required to retain calf flesh, and keep the youngsters growing, but of course if a little linseed or crushed flax, some roots or other succulent food can be added, correspondingly greater gains will be made. Of course an abundant supply of good water (if the chill can be taken off so much the better) must be available and salt should always be within reach.

It is important that all male calves should be castrated early, at about two weeks old is probably the best time, but where this is not practicable, on the open range for instance, the operation should be performed as early as possible, and this is generally done when the calves are branded.

Yearlings.

No matter how much or how little care has been exercised in the breeding and feeding of the young bovine up to the time he attains the distinction of being a 'yearling' he is henceforth expected to rustle for himself. From the quarter-section farmer, with his half-dozen calves, to the big rancher with his thousands, it is all the same, the 'yearling' is not expected to require any further attention until he can be cut out into the beef herd or turned into the feed lot, and yet it is at this stage that it would seem that both the rancher and farmer could very materially increase his profits. The yearling steer 'roughed' through the winter may grow bone and gain in size, but he does not hold his flesh, whereas were he given a meal ration, a small one of say two or three pounds per day, he would not only make better growth, but he would also hold his flesh and in the end attain his beef maturity almost a year sooner. This is a point that has not received much attention but is one of vital importance from a profit making standpoint.

REARING AND FINISHING.

Having established a uniform herd of vigorous cows of good beefing quality one has made a long step forward towards the production of high-class steers for the market. Important as are the cows in determining the quality of the offspring it is even more important that the herd be headed by a thoroughly good bull, good not only in conformation, vigour and disposition but in breeding as well. It is not enough to know that he has a recorded pedigree, nor even that both his sire and dam were good individuals. The generations before these have a powerful influence and one looking for a herd bull cannot be too careful to assure himself that for several generations his parentage have been good individuals and the cows copious milkers. With a herd of good cows so headed the stockman has the foundation laid for producing steers of the highest quality.

THE YOUNG STOCK.

Owners of comparatively small herds, especially those who milk their cows, as a rule prefer to have their calves come in the fall, while ranchmen and others who prefer to winter cheaply and allow the calves to run with their dams select the spring as the proper season for the calf crop. In the autumn the cow is in fine physical condition after her season's grazing and therefore yields a vigorous offspring. Then with good stabling and feed and a painstaking herdsman the calf gets a fine start in life under the direct eye and personal supervision of the owner. This on high priced land counts for much as every pound of food given should return a corresponding gain in weight. Animals produced and grown for beef should be liberally fed from birth until finished so as to reduce to a reasonable minimum the time of growing into the size and condition for which the markets pay the highest price and this at the season of year when values are at their highest. In practice the most prosperous cattle feeders who raise their own steers market from March to July at ages ranging from 27 to 30 months old. Such cattle are as a rule dropped in the late autumn or early winter months. Nor should the spread of calving time for the herd be more than is necessary as uniformity of size in calves or older cattle is not only a feature to the herdsman but always more attractive to the buyer. It is a comparatively simple matter to care for calves that are allowed to suck. A copious milker will rear two calves leaving one cow to supply milk for other purposes. Calves do better when housed apart from their dams and let out to suck three times daily for the first month and twice daily afterwards. When allowed to run with the dam constantly they not only worry and drag her down unnecessarily but depend upon the udder long after they should commence to take food from the trough. In almost every herd there are good cows that are tough or otherwise troublesome to milk. It is the custom of some to put two calves on these allowing them to suck twice a day for five months when they are weaned and a third calf put on. Three very good calves can be raised on a cow in one season with very little labour.

The Calves.

The great majority of beef cattle raisers, more especially in the older provinces, rear their calves at the pail. Opinion appears to be about equally divided as to whether the calf should be removed at once after birth or allowed to suck for two or three days. The latter plan has always appealed most strongly to the writer as the calves appear to get a better start. Those who favour the other plan claim that it gives less trouble as the cow does not fret so long and the calf that has never sucked is more easily taught to drink. Either plan is satisfactory if wisely managed. No calf intended for beef should be deprived of new milk in the whole state for at least two weeks. It does not answer so well to give the milk of another cow unless she too is newly calved as the milk of a cow long calved is very likely to cause digestive derangement in a very young animal. Many of the most successful feeders continue feeding whole milk for four or even five weeks, believing that it pays in weight made. It is an easy matter to over feed a young calf, causing indigestion and perhaps a pronounced unthrifty condition. Three pints morning and night and two pints at noon for a few days is quite enough and this should be very gradually increased to from four to five quarts twice daily at the end of four weeks.

The change from whole to skim milk should be made very gradually. Not more than one pint of the whole milk should be substituted by skim at first and this may be increased day by day until in two weeks the change to skim milk will have been completed. As the whole milk is taken out the deficiency should be made up by adding a small quantity of flax seed jelly. To make this for one calf allow a desert spoonful of flax seed to simmer (not boil) in a pint of water for several hours on the back of the stove when it will become a jelly. This quantity is fed twice a day and week by week increased until when the calf is three and a half months old it is receiving the jelly of half a cup of flax seed twice daily. Some feeders use well cooked porridge made from oat meal and fine shorts along with the flax jelly and milk, but in using these one has to exercise great care to see that the food is agreeing with the calf. At the first signs of poor appetite or scours a return should be made to new milk for a few days and after a complete recovery the return to the mixture should be gradually made.

Each calf should be fed by itself out of a clean tin or galvanized iron pail which should be kept thoroughly sweet and clean by washing and scalding after each feeding. Much annoyance and difficulty may be avoided by providing a small stanchion or stall for each calf. If kept fastened in these while feeding, and for half an hour afterwards, all crowding is avoided and the calves do not acquire the habit of sucking each other. Have the manger so constructed as to hold securely the feed pail and when the calf is old enough to eat chop if a small quantity is placed before it after the empty pail is removed, the calf will very soon learn to masticate this solid diet. Since more or less milk is sure to be slopped over into the manger it is important that it be scrubbed out frequently in order to keep it clean.

The ideas of even successful feeders are not uniform as to the best age to commence giving coarse food. Some place a small quantity of suitable fodder at their disposal when they are two weeks old allowing them to take what they want at their own discretion. Others believe it is better not to encourage the eating of coarse foods until their stomachs are so developed that they will start to chew the cud. This is generally from two to three months old. In all matters of this sort it is generally safe to follow the inclination of the animal by placing food within reach when the calves are about three weeks old. Clover hay, preferably alfalfa, is safe to commence with. A small quantity should be given in a rack daily. Then a handful of pulped roots with bran or ground oats should be placed in a flat bottomed trough. This should be replenished each day, once or oftener, whether eaten or not and the trough kept thoroughly clean. When the calves have learned to eat well no more should be given than is readily eaten up as this means the appetites are kept good and digestion keen and on this depends the thrift of the calf.

Whether the calf is to be rushed along for baby beef, finished at 18 to 24 months old or kept six months longer, will influence the liberality of feeding after the first winter. In any case it is safe to wean at from 6 to 7 months old. If baby beef is desired the grain ration must be continued right along in liberal quantities but otherwise a small feed twice daily along with a plentiful supply of grass will maintain a steady growth. After a calf has reached two months of age a mixture of whole oats and bran in equal parts is a good ration and if flax seed jelly is not being fed a small quantity of oil cake meal added will help. In quantity three-quarters of a pound of the mixture per 100 lbs. live weight per day is considered about right for growing calves. Some recommend mixing chop with the milk fed but this is not good practice, because the solids are carried past the first stomach where they should be partially digested.

Fall calves may be grazed most of the summer if the pasture is good and a shade provided but later born animals are better to be housed at least during the days of warm weather while the flies are bad. Undoubtedly the best calves can be raised by housing in comfortable sheds and having the grass brought to them, but few care to perform the labour necessary to such a course and then there are advantages to the future of the animals if they learn to graze the first summer. In any case they should be protected from extreme heat and flies and receive a grain ration once or twice daily in addition to abundant green food. As cool autumn weather comes on they should be housed at night and allowed to graze during the day; it helps wonderfully to give them a run on rape or a daily feed of green corn run through the cutting box.

The Yearlings.

By the beginning of winter the calves will have become yearlings and on a fair way to beeves. They should now be housed in loose boxes or pens and those that run together should be about the same age. Unless the pen is roomy it is wise to allow them a chance to exercise in a yard or open shed for a short time each day. There is no advantage in having the pen warm, but it should not be cold or draughty. A constantly comfortable bed with good ventilation and plenty of light add to the well doing of the youngsters.

It is common practice to exercise too great economy in the feeding of yearling steers. Unless they are kept growing well during their first winter out of calfhood much time and feed is lost. It is well understood that the gains made from light feeding are relatively expensive. Other things being equal the cheapest gains are made on full feed. As the ration is decreased from that point the food required per pound of gain increases uniformly until a maintenance ration is reached, when, all of the food given is wasted when considered from the standpoint of gains made. When the ration is reduced to a point that the animal looses weight the deficit to be met is not only the total cost of the feed used but the value of the loss in weight as well.

At this age it is not always profitable to feed heavily. Unless a steer is to go out as baby beef what is wanted is the maximum of growth without much fattening. At this age the tendencies of the entire organism are to convert food into growth and every advantage should be taken of this. If baby beef is the object the quicker they are made fat the greater the profit in feeding, but if not they should be made to utilize at least a portion of the cheaper fodders of the farm. For steers that are to graze the following summer with little or no grain ration it is of no advantage to feed a heavy grain ration during the winter as the gains made on the grass will not be as great as though the animals were less fat but growing and thriving well when turned out.

The provident feeder will have supplied himself with a generous quantity of nourishing dry fodder and succulent food as well. Where it can be successfully grown corn ensilage has become the popular fodder for cattle of all classes except calves. It is bulky, nourishing, palatable and succulent and with it straw can be utilized to advantage. There are still many feeders who adhere to roots as the succulent part of the ration, but when a feeder has given ensilage a fair trial he seldom returns to roots to the exclusion of the other food. A supply of both is undoubtedly the ideal provision as variety of diet is an important consideration in cattle feeding. If the cattle are to be carried over another year little hay need be fed during the winter when the ration should consist of corn ensilage with a little cut straw, all that may be eaten twice daily; a small feed of roots and long hay (preferably clover) once daily and enough of grain chop to insure rapid growth without fattening. The grain mixture may consist of whatever is most readily secured and the quantity fed will be guided by the intelligence of the feeder. If the cattle are to be turned off finished during the early summer both hay and grain should be more liberally fed. A good standard ration for cattle at this period to be turned off at 24 months old is roots or ensilage 20 to 30 lbs.; hay, ⅔ and straw ⅓, all that may be eaten; chop 1 to 2 lbs. per day. With such a daily ration intelligently administered stockers will go out in fine condition to advance rapidly on pasture.

Good pasture with plenty of water and shade will suffice for the following summer. Towards autumn it may be necessary to provide a supplementary ration such as green corn or a field of rape. In any event there should be no lack of food. Every pound made should be held, and growth should be continuous and rapid. Even though fall pastures are abundant a run on a field of rape before housing will give the animals a fine start for the coming winter which in many cases is the finishing period except perhaps those that are to be marketed off grass the next summer.

FATTENING IN CENTRAL CANADA.

Success in beef raising depends a great deal on the method of fattening. At best it is an expensive process and unless wisely managed the expected profits may be wiped out and a decided loss experienced. The preceding sections have described the proper kind of cattle to feed profitably and the method of rearing them up to the beginning of the winter which should constitute the fattening period.

In the provinces east of the Great Lakes two general systems of fattening are followed. In many districts the cattle are finished to go out from March to May while in others the finishing is continued on pasture until June, July or August. In the western provinces, both winter and summer fattening are in vogue. The systems followed there are described in another section of this bulletin. In order to arrive at the best systems of fattening cattle sets of questions covering the principal points in the process were submitted to a number of the leading feeders who have for many years been successfully fattening steers on a more or less extensive scale. In addition to the valuable information submitted by these men the lessons learned from the experiments conducted at the experimental farms have been drawn upon and these with the practical knowledge of the writer form the basis of the following treatise. On account of the differences, climatically and otherwise, cattle fattening in Ontario and Quebec differs to some extent from the systems followed in the maritime provinces. For this reason the subject is divided, the methods in Central Canada being dealt with first.

The great bulk of the well finished cattle sold off Ontario farms are given a fattening ration for from 150 to 180 days. A comparatively large number are put off at from 90 to 150 days while another section of feeders keep them on for 200 days or longer. The 150 to 180 day feeders put up their cattle in the fall, usually about the middle of November start them off on a light grain ration increasing it gradually until a full ration is reached in about three months. They are then ready for the market in April or May. Those that feed for shorter periods put up cattle in higher condition, called 'short keep' feeders, feed heavily from the start and turn off at Christmas or other favourable season. The cattle thus turned off are usually very good and are always in demand at the top prevailing price. Those that hold stock for 200 days or more have good pasture farms which they graze down by midsummer when the cattle are sold. As a rule such pasture, is not again grazed until the following spring when it is early ready to support a good stock of animals. According to the evidence of the feeders consulted there is profit in all of these systems according to the localities, management, etc. In sections where the soil is light and therefore subject to dry out in summer, finishing on pasture does not succeed. In such districts both clover and ensilage corn are usually easily grown and these with grain are favourable for wintering fattening. In other sections, notably in Middlesex, Lambton and Huron much land is admirably adapted to grazing. Here is where a large number of the summer exporters are produced. This system requires comparatively little labour as the feeders are usually purchased and the land requires no cultivation. The feeders of short keeps are careful to select choice stock at seasons to have them finished to catch the best markets. They adopt intensive methods learned by specializing and in this way secure the greatest gains for the food consumed and having superior beeves secure the highest prices going. Unless one has a large amount of experience or a specially good pasture farm the middle course is safest as the coarse fodders are transferred into a valuable marketable product, a large amount of fertilizer is secured to keep up the land and the cattle go away before the busy season in the fields and before the dry fodder becomes unpalatable and the roots exhausted. The market at this season is invariably good, more especially for the export trade.

Housing.

The ideas of feeders in regard to housing have changed materially in recent years. It is not long since the 'bank barn' was looked upon as the ideal quarter for the fattening steer. Warmth was the chief consideration and comparative darkness was not objected to. Undoubtedly good cattle have come out of these old fashioned cellar-like stables, but the progressive feeder has abandoned these dingy houses for more sanitary quarters where pure air and sunlight can enter and where the animals may be cared for in comfort. All progressive feeders now concede that the airy light stable is a necessity, the unsettled question being tying versus feeding loose.

The feeding of grown cattle loose in pens commenced to receive attention in Canada in the early nineties. About that time the feasibility of removing the horns became generally accepted. Having accomplished this, one of the great barriers to loose feeding was overcome. Then the securing of farm labour became a difficulty and having taken off the horns the next step was to remove the stalls and ties and adopt the long trough and rack. Both the Dominion and Provincial Experimental Farms carried on comparative tests and proved conclusively that loose feeding has the advantage both in gains from food consumed and in labour in caring for the animals. On this point, J. H. Grisdale, of the Experimental Farm says: 'Loose feeding is more advantageous because results have been uniformly more profitable everything considered.' Prof. G. E. Day, of the Ontario Agricultural College says: 'Our experience leads us to believe that it is more profitable to feed steers loose than to tie them in stalls. Loose steers are less easily surfeited, are less likely to become crippled or sore in their feet, and appear to shrink less on the way to market.'

The opinion of extensive feeders for the export trade is not uniform. Those who put off short keeps that are hastened to a finished condition seem to prefer stall feeding. Those who feed from five to six months, disposing of their cattle in April or May, are about equally divided in opinion. Those who carry their stock over to July or August on grass almost to a man pronounce in favour of loose feeding.

By tying the cattle individual attention can be given to the requirements of each animal. For this reason it is preferred by men who have thoroughly competent herdsmen and endeavour to secure superior uniform finish for a high market. On the other hand feeding may be done in loose pens by less competent men, as one requires only to know what each pen needs, rather than each individual. Then when the cattle are taking exercise they are less liable to suffer from inaccurate feeding.

Undoubtedly for cattle that are to graze the loose system of winter feeding has the advantage. The animals are always keen for their feed at feeding time and therefore consume and appropriate copious meals of cheap fodder. This with a small grain ration gives cheap gains and a generally thrifty condition. The digestive organs are invariably maintained in the best possible form so that when pasturing is commenced large quantities of food are eaten and quickly converted into beef. One experienced feeder states that if he were building new or overhauling old stables he would not put in stalls but construct long rows of mangers with stanchions that could be opened or closed from one end. By this means the cattle could if desired be fastened for an hour or two while feeding or be left tied continuously. This would make possible a compromise system adaptable for cattle of different sizes and for a varied system of feeding.

There is but one opinion held in regard to the economy of labour in the loose system. The food for a dozen or more head is as readily distributed as for three or four animals standing in stalls. Then the cleaning out and bed-making twice or oftener each day gives place to the much simpler and easier system of bedding twice a week and removing the manure even less frequently by wagon, cart or sleigh, and applying it direct to the land. Objection is taken to the loose housing on account of the larger amount of straw required to keep the animals clean and dry. On small farms where the acreage of grain grown is small this argument undoubtedly has force, but where straw is not scarce no better means can be found of converting it into the best quality of manure. Some feeders use very little bedding even with loose feeding and claim to see no objection to having the animals dirty. If cattle are to do well it is undoubtedly important that they be comfortable and if they are to bring their full value on the market they must present a clean and attractive appearance. It therefore pays well to provide cattle with a dry bed of straw or other absorbent material.

Feeders differ in their views as regards the number that should run together. Some say 5 or 6 is enough, others 10 or 15, while others run the whole lot together, even up to 30 or more head. Unless abundance of space is provided for all the animals to get to the trough without crowding, care should be taken to have them graded. It is sometimes necessary to select out the less vigorous or cowardly ones to be tied up or fed in a separate pen.

Mr. George P. Barrie, of Galt, Ont., who has been feeding loose for some ten years has a system that is worthy of description on account of its simplicity. The shed, beneath a barn 40 by 80 feet accommodates 30 head of steers. It has open racks against the walls into which long fodder is fed from above. It has also a feed bunk or manger 4 ft. 6 in. wide running down the centre of the shed, leaving about 12 feet at either end for a team and wagon to pass when hauling out the manure. Over the centre of the feed bunk running lengthwise is a wooden car track which leads into a feed room. On this a car large enough to contain feed for 30 cattle is suspended. The car when filled with ensilage, cut straw and chop, thoroughly mixed, is pushed along the track, over the bunk where the feed is distributed to the cattle in a few minutes. The amount of feeding space allows shy feeders to find a spot unmolested by the more vigorous cattle. The pen is bedded twice weekly with cut straw 4 to 6 inches long, and cleaned out once a week. The cattle when seen in March were as clean as grass cattle and appeared just as contented and happy. They have access to a trough of water in an open yard during the day and are closed in each night during the cold weather. Mr. Barrie regards feeding steers tied in stalls as a laborious and expensive method and not to be compared with his present system. The space given by Mr. Barrie (106 sq. ft. per head) is open to criticism if one had to build. A narrower building would answer as well, especially if an open yard is utilized during the day. A plan of Mr. Barrie's shed is shown on page 91.

The question of tying or feeding loose is after all largely a matter of convenience. To the man with a small herd it makes comparatively little difference, but for extensive feeding where a car load or more are on feed at a time, loose feeding is of great advantage. In the 'Corn Belt' and other feeding centres in the United States, the tying of feeding cattle as a general practice has long since been abandoned, being considered quite out of date ranking with the scythe and the cradle of the early days.

Most Profitable Age and Weights.

The days of the heavy bullock are past and the life of the steer is gradually shortening. The weighty ox will still command a good price, more especially for the export trade, provided he is of good beef formation and well fatted. Finish is what is looked for on the market and is as much appreciated in the butcher's bullock of 1,100 lbs. as in the exporter weighing 1,500 lbs. Most of the finished beeves marketed by up-to-date Ontario feeders are from 20 to 30 months old and weigh from 1,200 to 1,400 lbs. These weights suit the market and gains made up to the ages given are economically put on. Mr. Grisdale, at the Central Experimental Farm, found that three-year-olds made a daily gain of 1·65 lbs. at a cost of $6.52 per cwt.; two-year olds, 2·16 lbs. per day at a cost of $5.99 per cwt.; and yearlings, 2 lbs. per day at a cost of $4.30 per cwt. It therefore follows that the younger the animals are finished the less the outlay per pound of gain for food consumed.

Raising Versus Buying Feeders.

Undoubtedly the average Ontario and Quebec farmer who feeds a few head raises his own cattle, but there are coming to be more and more men who make a business of feeding depending on others to raise the stock. To such an extent is this the case that the trade in feeders at the Toronto market, more especially during a period each spring and fall, is about as large as in finished stock. Then many feeding cattle do not pass through the market but are picked up by feeders throughout the country. In reply to a question as to whether it is preferable to raise or purchase feeders an experienced fattener replied: 'It is more satisfactory to raise, but more profitable to buy one's supply.' Much depends on one's land and his system of farming. In sections subject to drought, more especially on high priced land, it is well to have few cattle on hand during the summer months. To carry a full stock of all ages under such circumstances one must resort to some system of soiling in order to keep up the condition of stock. This is expensive and often otherwise unsatisfactory. By depending largely on buying one can purchase according to his supply of fodder and thus avoid loss by either over or under stocking. One extensive feeder who turns off cattle at two or more seasons says:—'Buying is more satisfactory to me as I can turn money over faster than if I raise my stock. I know what feed I have and can fill my stable accordingly. In this way I am never over-stocked and do not have to sacrifice for want of feed. I can buy steers 24 to 30 months old cheaper than I can raise them.'

Breeds and Grades.

The bulk of the good steers raised in Ontario and Quebec are Shorthorn grades. There are also a good number of grades of other beef breeds. Most of those who have given the different breeds a fair trial like one as well as another. One feeder prefers Shorthorns for stall feeding and Herefords for grazing. Shorthorns are said to be more docile than the others. An extensive feeder speaks a good word for the Aberdeen-Angus. He says: 'I get good cattle among all the beef breeds and crosses, but have had best results from the Aberdeen-Angus and grades of this breed. They are more uniform, have better constitution, eat more rough feed and do well on it, then they require no dehorning.'

Selection of Feeders.

Much of the success in feeding purchased stock depends upon the selection of the animals. Even the most skilful management and best of feed cannot make profit out of badly selected steers. When one has raised his own steers from good breeding stock he knows how to treat them for best advantage and what to expect, but a keen eye and good judgment are necessary to enable one to select strange stock that will make profit in the fattening. One will judge from his proposed plans whether he should buy thin cattle or half fat 'short keeps.' Well grown half fat bullocks are usually more profitable to buy in spring to go off grass in July or August. If they have not been heavily grain fed such cattle will usually gain rapidly on good grass, going out 200 lbs. or more heavier and worth from one to two cents per pound more than when purchased. For long period feeding thin steers are usually preferred, as they are more cheaply purchased, and one has more opportunity to control their progress. In any case it pays to select growthy animals of good beef type showing strongly the blood of one or other of the beef breeds. It is advantageous that they be as nearly uniform in colour as possible as then they present the best appearance when fat. A wise feeder remarked that: 'One sells his cattle when he buys them.' The good ones are always in demand, and with those up to a certain point, the seller can dictate his own price. Poor ones known as 'tail enders' are invariably a disappointment and a loss to all who touch them.

In general form the select feeder is low set, deep, broad and compact. Their top and underlines should be straight and nearly parallel. One should look for as much smoothness as is consistent with thinness. Too great prominence of shoulder, hips and tail-head should be avoided as should rough, coarse heads set with small, dull eyes. A good feeder possesses a short, broad head and short thick neck and short legs. A large prominent and bright but mild eye is very desirable as it indicates vigour, as well as quietness of disposition and these are both essential to well doing. The lower jaw should be heavily muscled and the muzzle, lips and mouth large without coarseness.

It is important that a feeder possesses that characteristic difficult to describe known as quality. This is of two kinds, general and handling. The former is closely allied to breeding and is quickly discerned by the trained eye. Good handling quality indicates thrift which is dependent upon good health and general vigour. It shows itself in a mellow but moderately thick and loose skin, a thick and soft coat of hair of medium fineness. A steer that possesses the qualifications already described will almost assuredly have a vigorous constitution. It is well, however, to see to it that he has a wide deep chest, fulness in heart girth and good spring of rib. Such feeders as have been described are not the most plentifully offered but in buying one should secure the best available at the price one feels justified in paying. Buyers who purchase throughout the country from year to year soon learn to avoid the special dairying districts and to stick closely to those where the high-class pure bred beef bull is generally used and appreciated.

An experienced feeder, who turns out specially good cattle, receiving the top price for them says: 'Good cattle, to finish properly and profitably, is the great want in Ontario these years. Good ones pay well to feed but the majority of those marketed never pay for the feed used. A poorly bred 1,000 pound steer bought at 3 cents per lb., with 300 pounds added and sold at 4 cents, gives $22 for feeding. The good quality steer of 1,000 pounds, bought at 5 cents, increased in weight 300 pounds and sold at 6 cents, gives a return of $28 for the feed used. Summing up the two steers, each started at the same weight, each increased the same number of pounds and sold at the same increase of price, viz.: one dollar per 100 pounds gives a return of $22 for the low quality animal against $28 for the high priced steer. In a stable of 20 cattle this would make a difference of $120 more margin of profit in favour of the good ones. Surely the seller of the $30 steer would have to rest content with probably no profit while the $50 stocker would give a handsome profit to the grower. It is the well-bred early maturing bullock we must have in order to make feeding profitable.'

The Buying and Selling Margin.

One has to be careful not to pay too much for his feeders. A number of buyers claim $1 per cwt. less than the selling price will give a profit, others say $1.25, and still others $2 per cwt. is necessary. Much depends on the condition of the cattle and the time they are to be fed. On a thin steer weighing 1,000 to 1,100 lbs., requiring 150 to 180 days to finish, the lowest margin should be about $1.50 per cwt.; a fatter animal of the same weight to be kept only 100 days, a margin of $1 per cwt. would be a fair return, while if he is to be held two months or less, 75 cents per cwt, would give a profit. One extensive feeder says: 'I usually pay $3.50 per cwt. in October for cattle I expect to sell in spring at about $5.50 per cwt. Another pays $4 per cwt. in the fall for 1,000 lb. bullocks that he expects to sell for $5 the following June. This feeder gets the advantage of cheap gains on grass following a winter of moderately light feeding. Another feeder estimates that one should get at least 25 cents per cwt.

per month advance over the purchasing price. Some of these margins may seem little but it must be borne in mind that one gets the advance not only on the gains made but on the original weight of the bullock as well.

Gains Made by Fattening Cattle.

A large number of feeders consulted secure gains of from 1½ to 2 lbs. per day per head during the winter and a little more in summer. One feeder says: 'A bunch of steers should make an average gain of 50 lbs. a month. Some will do better and some not so well, but the lot should average 300 lbs. heavier than when weighed in after having been fed six months.' This is for winter feeding. A grass feeder says: 'Cattle in very good condition, put on grass in May and sold in July, will have gained from 1½ to 2 lbs. per day according to the season. On thinner cattle we can easily get a gain of 2 lbs. per day on good grass during the summer with the exception of the very hot weather in August and beginning of September. Another feeder feeds his cattle to gain 150 to 200 lbs. through the winter and 150 lbs. on grass. This man feeds meal on the grass to those shipped out early in the summer.

Methods of Feeding and Rations Used.

To get the most out of one's feed and cattle requires more than the application of rules, no matter how good these may be. A veteran feeder puts it thus: 'No man will ever be a successful feeder unless he takes 'brains' into the stable with him. Regularity in feeding, kindness and pains-taking attention are amongst the most important factors of feeding.' The animals must be comfortable at all times. This involves not only comfortable quarters, but no inconvenience at any time from indigestion or other unnatural conditions. They must come to each meal with a keen appetite and go away from an empty trough satisfied. (An exception to this is where self feeders are used.)

In the early stages light feeding should be the rule, more especially in regard to the grain ration. There is possibly no better preparation for a season of fattening than a run on rape for a few weeks preparatory to housing. This food tones up the system and puts the digestive organs in fine condition. The good gains commenced on the rape are with careful feeding likely to continue. Two months on rape with heavy feeding in the stalls for forty days is one feeder's system of preparing well finished Christmas beeves. Those who feed all winter find it advantageous to start off with a very light grain ration and this mostly bran. Great importance is attached to succulence in the roughage ration. This is necessary to maintain the digestive organs in good condition. One highly successful feeder, who houses his cattle about the middle of November commences at once to feed ensilage, cut straw, grain chop, and clover hay. Each animal gets during the day a mixture of 25 lbs. of ensilage, 6 to 7 lbs. of cut straw, and 1½ lbs. of chop. These foods are mixed in the morning for the day, with a small quantity of salt added. As much clover hay is given as is eaten up clean. The meal ration is very gradually increased up to 8 or 9 lbs. to the animals being finished in the stable. Clover hay is substituted for the cut straw towards the finishing period and the quantity of ensilage is reduced towards the end. The mixture of grain consists of bran and shorts and a mixture of oats, barley, peas and goose wheat grown and ground together. The finishing cattle get from 1 to 4 lbs. of oil cake per day towards the end.

A feeder who does not use ensilage feeds cut straw, corn fodder, mixed grain chop, pulped roots and a little salt, all dampened and mixed 12 to 24 hours ahead.

One who depends on roots for his succulent ration commences on cut hay, turnips and a light meal ration. The meal is gradually increased up to 8 or 10 lbs. per day according to the size of the animal. The roots are liberally fed up to 40 lbs. per day.

A feeder who reports rapid gains mixes corn silage, pulped roots, chaff and cut hay, enough for two meals. This mixture is fed twice daily with chop thrown over it in the manger. Each animal gets 25 to 30 lbs. of ensilage and 12 lbs. of roots.

Enough of the chaff and cut hay is added to fill them up. The grain ration is commenced at the rate of 2 lbs. per day and increased to 8 lbs. towards the finishing period. Clover hay is fed whole once daily. Another feeder who uses practically the same foods does not give the meal rations until the coarse mixture is half eaten. This he believes induces fuller meals. The liberal feeding of ensilage and roots sometimes induces an over laxative condition. To counteract this, feeders find it advantageous to use cotton seed meal as a portion of the grain ration. From one to two pounds per day is usually fed for this purpose. Cotton seed meal is a highly concentrated food possessing valuable feeding qualities.

Mr. J. H. Grisdale at the Central Experimental Farm, in several years experience in fattening cattle has found the following foods and system of feeding most profitable. The roughage mixture consists of ensilage, roots, straw and hay. These with the exception of the hay (clover) are mixed together a few hours before feeding. The proportions for each animal per day are about: ensilage, 40 lbs.; roots, 15 lbs.; cut straw, 4 to 5 lbs.; and long clover hay, 4 lbs. The meal ration is fed as follows:—

1st and 2nd weeks, none.
3rd week, 1 lb. bran.
4th week, 2 lbs., chiefly bran.
5th and 6th weeks, 3 lbs., consisting of bran, 2 parts; and oil-cake or gluten meal, 1 part by weight.
7th, 8th and 9th weeks, 4 lbs. above mixture in equal parts.
10th, 11th and 12th weeks, 5 lbs. above mixture, bran, 1 part; oil-cake or gluten meal, 2 parts.

It will thus be seen that the roughage ration is constant, while the meal ration is light and cheap in the early stages and gradually increased both in quantity and richness. Cattle fed in this way appropriate the maximum of food consumed.

The above systems are for cattle being finished for the winter and spring trade. Cattle to be finished on grass are fed in practically the same manner in so far as the rough foods are concerned. The grain ration, however, seldom or never goes above 3 lbs. per day unless in the case of heavy cattle to receive a grain ration on the grass. Then grain may be fed more heavily during the winter and spring months without risk of loss owing to the change from dry feed to pasture.

Buying Food for Fattening.

It is the consensus of opinion of experienced feeders that it is not profitable to purchase coarse fodder. A few consider it practicable to purchase hay if necessary, if it can be bought at not more than $6 per ton. As a rule feeders put up no more cattle than they have home grown fodder to supply.

Most feeders object to buying grain unless it can be purchased at not more than $1 per cwt. They endeavour to raise all their grain foods as well as their coarse fodder. As a rule those who buy concentrated food select those sorts that give variety or balance to the ration. One feeder buys bran and oil cake to mix with such heavy feeds as barley or corn. Another buys corn when he can lay it down on his farm as cheaply as Canadian coarse grains. A number find it profitable to purchase oil cake, cotton seed meal or gluten meal, and corn to mix with such home grown feeds as oats, barley and peas. The oilcake, cotton seed meal and gluten are used more particularly during the final three or four weeks of the finishing period.

Home Grown Grains.

It is customary for many feeders to grow feed grains in mixtures. It is claimed that larger yields are secured and the grain is mixed ready for grinding. The report of the Bureau of Industries for Ontario shows that almost half a million acres of mixed feed grains were grown in the province in 1906. According to experiments conducted by Prof. C. A. Zavitz, of the Ontario Agricultural College the highest yields of grain per acre in the average of the two years 1907 and 1908 were produced from a seeding of 4 pecks of oats and 4 pecks of barley per acre. For the best results a comparatively late ripening barley such as Mandscheuri and an early sort of oats such as Banner should be selected. These are both good yielders. In earlier years different mixtures were tested. In the average of four years a mixture consisting of oats, 34 lbs.; barley, 72 lbs. and flax 28 lbs. per acre gave the heaviest yield per acre. The same quantities of oats and barley with 30 lbs. of spring wheat instead of the flax gave a heavy crop. A successful cattle feeder and first-class farmer sows the following mixture per acre: oats, 6 pecks; barley, 2 pecks; goose wheat, 1 peck; peas, 1 gallon; and flax, 4 lbs. The flax seed must not be buried as deeply as the grain. Peas and oats and oats and barley are profitable mixtures, while oats, barley and goose wheat find favour on many farms.

Roots Versus Ensilage.

Almost every feeder consulted prefers ensilage to roots while a large proportion consider a mixture of the two preferable to either alone. Corn is considered a much surer crop and it will give more cattle feed per acre than any other crop that is grown. It is also most economically produced from the standpoint of labour. One feeder says: 'Once in a silo it is like a bank account to draw from all winter long with no labour to prepare it for feeding.' Another, who expresses the view of many, put it thus: 'Corn ensilage is decidedly the better, considering labour and yield. I, however, value turnips highly, and although they cost more than corn ensilage no feeder can afford to be without them.' A user of both foods says he prefers the mixture because cattle do not go wrong as often with some roots as when fed on ensilage with dry fodder and grain without them. In addition to the food value of roots they have a peculiarly salutary effect upon the digestive system. In a less degree corn ensilage performs the same office although cases of indigestion are believed to have been caused by this latter food when not properly cured. Roots on the other hand when fed in reasonable quantity and in sound condition tend to correct any little derangement that may have been caused by other foods. Roots are especially valuable for young stock, whereas ensilage should be fed only in very limited quantities to animals under a year old.

Systems of Watering.

An increasing number of feeders are each year installing watering systems whereby cattle have constantly before them a supply of fresh water so that they may drink as frequently as they wish. If one is to follow nature this is the ideal system, as undoubtedly an animal's thirst is its guide as to when it requires water. No reports of experiments touching this question in regard to fattening cattle are available. Experiments with milch cows showed that those having free access to water gave at the rate of 225 lbs. more milk annually than cows watered twice daily. Most of the feeders in loose pens have watering troughs in one corner of the pen and many of those who feed tied have either individual drinking basins or a trough running through the stable along in front of each row of cattle. Others, who allow the stock access to an open yard, or turn them out once or twice each day to drink, have troughs in sheltered places in the yard. A number who have this plan intend to install indoor systems at an early date. Those who have water constantly available indoors claim that the temperature is moderate and large quantities are never drank at once. A few of those who turn out tied cattle to water in a yard claim that the animals are benefited by a short period of exercising in the open air. It sometimes happens, however, that one or more animals will be again housed without a drink and will suffer from thirst before the next watering time when too much is apt to be taken. Cattle that are receiving a liberal ration of turnips require comparatively little water and will do nicely on one drink daily, while those getting ensilage or dry food and no roots require water twice. A steer receiving up to six pecks of turnips daily is getting about 80 lbs. of fluid from this food alone and will do very well without drinking, more especially during the cold weather. Some animals tied, with water constantly before them, acquire the habit of lapping or sipping water much of the time. These are apt to take too much and suffer from scours. Such cattle should be deprived of the privilege of a constant water supply by either covering the basin, except at proper intervals, or housing them in another quarter. Whatever system of watering is adopted it is important that the animals drink comfortably whenever they need water and before any suffering from thirst is experienced. A system that does this with the least labour is likely to be satisfactory.

FATTENING IN THE MARITIME PROVINCES.

The production of beef in the maritime provinces is carried on to only a limited extent. Dairying is found to be more profitable, and for this reason the dairy breeds greatly predominate. Very little fattening on grass is done, although many cattle marketed from the pasture alone go direct to the butcher, but they are not fat. The bulk of the fattened cattle go off for the Easter or late May markets as the prices are usually highest at these seasons and the system of fattening suits this also.

Almost all feeders tie their cattle. A few favour loose feeding, if straw were plentiful, but it is usually scarce.

Very few feed off two-year-olds and a number who report their experience give 1,200 to 1,300 lbs. as the weight of finished three-year-olds. One feeder prefers in buying to select steers rising four to sell at an average weight of 1,500 lbs. It would seem as though the cost of production is not given serious study. The lessons of Ontario feeders on this point may be useful to feeders in the eastern provinces.

Very few have a good word to say for buying feeders. Those offered for sale, it is claimed, are usually badly bred and stunted in growth. One advanced Nova Scotia feeder says: 'In most cases I raise my own steers which are bred from beef strains of cows. These are well fed from calves and invariably mature early then fatten with 30 per cent less feed than purchased cattle and in a shorter period.' One Island feeder who raises his own stock raises two calves on one cow. As a rule steers that are bought to fatten have to be carried on to four-year-olds in order to get good carcases.

Grades of all breeds are said to be fed for beef in the maritime provinces. Most feeders recommend Shorthorn but a small number express a preference for Devon blood which is claimed gives smoothness and early maturity. These are said also to show greatest gains on spare pasture. A good word is spoken for Ayrshire grades which are invariably hearty feeders. Herefords and Aberdeen-Angus give satisfaction where used.

Replies in regard to the margin between buying and selling indicate that very little close figuring is done. Those consulted expect to get twice as much in the spring as was paid for the animals in the fall. One man says he usually pays $20 for animals he sells for $50 after six months feeding. Those who buy and sell by weight claim that from 1½ to 3 cents per pound of margin is necessary to make a profit. Much depends on the character of the stock. Gains on a fattening ration vary from 1½ to 3 lbs. per day, the majority reporting about 2 lbs. per day.

The maritime feeder does not, except in few instances, grow ensilage, but depends on roots for his succulent ration. Hay, roots and mixed chop is the usual ration used. The most successful feeders give hay and turnips until about the end of January then a light grain ration which is gradually increased until the limit of profitable feeding is reached. Hay is fed to the extent of satisfaction, roots up to 60 lbs. per day, and grain commencing at one pound and reaching 8 lbs. or in some cases 10 lbs. per day. At the Nappan Experimental Farm the best results have been obtained from the following method of feeding: For a month to six weeks each animal gets 60 lbs. of roots, about one pound of chop and clover hay with a small quantity of straw per day. The chop is gradually increased and roots or ensilage decreased until it is getting each day 7 to 8 lbs. of chop and 15 to 20 lbs. of roots or ensilage.

As a rule beef cannot be profitably fattened in the maritime provinces on purchased feed. Most feeders produce their own although a few buy oilcake to help out the ration. A small number of feeders, farming light land, find it pays to buy grain for feeding in order to get cheap fertilizer. Mixtures of barley and oats are chiefly used although some use peas. At the Nappan farm, barley, oats and peas are mixed and grown together for cattle food. Clover hay and good oat straw comprise the favoured coarse fodder. Roots are preferred to ensilage because the former crop is more certain. It is claimed to be as easy to grow 30 tons of roots as 20 tons of corn per acre with little difference in labour.

Many feeders who use roots liberally do not water their cattle. A few have water before the animals in the stable and like it. The rule is to water once daily during cold weather and twice daily afterwards at a trough outside. Maritime feeders may profit from a study of the methods employed in Ontario and Quebec as described in earlier pages.

BABY BEEF.

While baby beef is not a quoted commodity in Canadian beef market reports, a certain amount of quite young well finished beef is sold in the largest cities each year. It is not for lack of appreciation of baby beef that the market does not call out for it nor set a price upon it, but for the reason that the supply is too small as to make little or no impression. Interviewed regarding baby beef one of the largest meat handling companies in Eastern Canada stated that the supply of such cattle is confined very largely to the Christmas and Easter markets. The term 'baby beef' applies to bullocks or heifers ranging from 18 to 22 months old and weighing from 900 to 1,100 lbs. Such cattle being well fatted, dress out from 58 to 60 per cent of carcass of the finest quality of beef, being juicy, tender, and of excellent flavour. The consumer who gets a roast or steak from such a carcass usually comes back for another prepared to pay a premium to get it, but the supply is exhausted, so that no regular trade in 'baby beef' is allowed to develop. Cattle such as described bring an advance of from 60 cents to $1 per cwt. at holiday seasons and from 40 to 50 cents per cwt. at other seasons of the year. It is worth the latter advance on account of the high dressing percentage and the larger premium because of the superiority of the meat. The firm referred to would be glad to handle from 60 to 100 such cattle per week throughout the year for Toronto alone and pay a half dollar premium for it over the regular market price of No. 1 butcher's cattle.

In the United States the production of 'baby beef' is growing into an extensive branch of the cattle industry. There, well bred calves are bought by feeders and fed on a full fattening ration for about twelve months, when they are ripe for the trade. In Canada the few that are sold are fattened on the farms where bred. They are usually reared on their dams, never allowed to lose their calf flesh and receive a grain ration continuously through life. Two requirements are necessary in the making of baby beef—well bred breeding stock and liberal, judicious feeding. Without the former, thickness of flesh in the best parts cannot be obtained, and without the latter, proper finish on such young animals is impossible.

It has been proved again and again that gains are most cheaply made in young animals. An experienced feeder of baby beeves puts it thus: 'Two calves will eat no more concentrated food than one big steer and make double the gain. A feeder will do well to put 600 lbs. on a 1,000 lb. steer in a year while two well bred lusty calves, properly fed, can easily be made to gain 1,600 lbs. in the same time at no greater cost.' He figures that if a calf costs $25 and the big steer $50 at the start, he is one fat animal to the good at marketing time. Any two young animals will give better returns for their food than one approaching maturity and this applies to cattle, hogs or sheep. This does not mean, however, that high finish in baby beeves is secured at little expense. The tendency in calves and yearlings is to grow rather than fatten, so that fattening is accomplished only at the expense of generous feeding. A certain proportion of rough fodder is necessary to develop the digestive power of the animals and this should be of good quality. The ration must in the main be rich and well balanced. Probably the best rough fodder that can be fed is clover or alfalfa hay and silage in winter with abundant pasture or soiling crop in summer. Chopped oats is safe feed and tends to develop thriftiness, but to this should be added such foods as corn or pea chop, oil-cake, cotton seed meal or gluten meal, the latter heavier meals being increased in proportion to the lighter as the finishing approaches. When turned on pasture the grain ration may be decreased while the grass is abundant but it seldom pays to discontinue it no matter how good the pasture. Heavy weights are not desired or advantageous but it is hardly possible to make yearlings too fat for the market. As a rule heifers fatten more rapidly than steers and can therefore be got ready earlier.

Considerable experimental work on baby beef production has been done by J. H. Grisdale, at the Central Experimental Farm. This work has been carried on each winter for a number of years chiefly with a view to ascertaining whether it is more profitable to rear beef cattle on a relatively poor ration or push them along on good feed right through their lives. Calves of grade Shorthorn cows calved in May, 1906, were fed on a comparatively heavy ration for 627 days or about one year and nine months. During this period each animal gained 937 lbs., which when added to the original weight 115½ lbs., made 1,052½ lbs. each. The cost of gain was figured out to be $4.63 per 100 lbs. These cattle were not allowed to pasture but had all their food taken to them. Nor were they allowed to suck their dams. Following is the kind and quantity of food eaten by each animal in the group:—

Oats, 559 lbs.; bran, 893 lbs.; gluten, 154½ lbs.; barley, 159 lbs.; corn, 181 lbs.; oil meal, 209 lbs.; ensilage and roots, 13,928 lbs.; hay, 956 lbs.; skim milk, 1,719 lbs.; and green clover, 163 lbs.

Not having access to a market where baby beef was appreciated they sold for only $50 each, but the buyer found such satisfaction in handling them that he would gladly have given a higher price for more of the same kind.

Owing to interruption in the feeding of the above lot of cattle, due to the overhauling of the barns, the gains were lower and the profit less than with previously fed lots. The groups fed off the previous year made better returns. Calves dropped in the spring of 1905 were fed on a full ration for 414 days, being sold at less than 15 months old. At the commencement of the experiment the weight of each calf was 159 lbs., and cost five dollars. At the end an average gain of 758 lbs. had been made, bringing the total weight up to 917 lbs. The cost of gain was found to be $3.84 per 100 lbs., which was 79 cents per 100 lbs. less than the group fed the following year and held six months longer. As in the above case the cattle were hand fed right through. The cattle sold at $5.25 per cwt., less 4 per cent, leaving a profit, over original cost and value of food, of $12.10 per head. The food consumed by each animal was as follows:—

Oats, 396 lbs.; bran, 95 lbs.; barley, 57½ lbs.; corn, 2 lbs.; oil-cake, 168 lbs.; gluten meal, 47 lbs.; ensilage and roots, 8,443 lbs.; hay, 1,095 lbs.; skim milk, 2,270 lbs. The cost of this food was estimated at market values to be $29.20.

Prof. Day has produced at the Ontario Agricultural College some excellent specimens of baby beef. They were reared and fed as object lessons for short course students rather than to ascertain the economy of producing such animals. For the Eastern market, 1908, he sold a small shipment at 7 cents per pound alive, which was fully a cent per pound higher than the highest published market quotation. If an advance of one cent per pound for baby beef over the general run of No. 1 butchers' cattle could be depended upon at all seasons of the year there is no doubt the production of this class of cattle would become more general, but the indications are that prime baby beef, like hot house lamb and other delicacies, will be produced by a few people who have the class of stock, skill and inclination to turn out a special class of product to meet the demands of a special trade. There is, however, a growing tendency to market cattle younger than formerly. The demand for such is strong even when in good but not extra fat condition. There can be no doubt in the case of calves which a feeder raises himself, it pays to keep them going getting them upon the market in the shortest possible time. It is not difficult to make yearlings that have been reared as calves on skim milk with adjuncts desirable to the market at 15 to 16 months old. Well fed stock of this age weighing up to 800 lbs. will bring as much per pound as older cattle that have cost considerable more in their lives for food simply of support. There is no doubt a better profit is realized by getting the finished steer off at this age than if he is dragged along in a half starved condition over another winter and fed off as a two-year-old. Such cattle need not command a premium over older steers to make a good profit provided they have been handled with judgment. These young animals make cheaper gains, and where the breeding is satisfactory there is little doubt that they will find many eager buyers. This applies particularly to the fattening of animals of one's own raising with such there can be only loss in semi-starvation. In the case of steers purchased for feeding it is not as a rule advisable to buy calves because frequently those offered are not well bred, and often they have not been well started in life. In buying there is less risk in depending upon heavier steers, the condition and breeding of which can be more easily estimated and on which the raiser has already experienced all the loss that is necessary.

The making of 'baby beef' in its highest form may be looked upon as somewhat of a special line requiring not only the knowledge of a well informed cattle man to breed or select the calves but the skill of a clever feeder to secure continuous gains from calfhood to beef. Unless the calves selected are of the thick, well bred kind possessing a natural tendency to fatten they are not likely to finish profitably under two years old. Unless the feeder is able to so gauge the feeding so as to insure constant growth as well as fattening he may not be able to secure gains in keeping with the early outlay of heavy feeding necessary in the making of finished beef at 18 to 20 months old. Unless thick, fleshy, lusty, well bred calves are procurable or unless the cattle can be placed in charge of a skillful feeder it is perhaps safer to adhere to the middle course of aiming to get the finished steers away at from 24 to 30 months of age. To defer the finishing beyond this age on a farm where mixed agriculture is practised is to reduce the profits accordingly unless the cattle are to be purchased and may be secured at a comparatively low price.

VEAL.

While veal can hardly be classed as a standard flesh food along with beef, pork and mutton, it occupies an important position in the meat markets of villages, towns and cities. The veal season is chiefly confined to the spring months although a considerable amount of it is consumed at all seasons of the year. Veal is very largely the product of dairy farms and the major portion of it sold consists of the calves of herds kept for the production of milk.

The statistics of the stockyards of Montreal and Toronto show that 90,000 calves were marketed at these two principal distributing points during the year 1908, and about 110,000 during 1909; the receipts at Montreal each year being practically double those at Toronto. Statistics further show that about 60 per cent were received during the four months commencing on March 1. For Montreal alone the proportion for these months was considerably higher than 60 per cent which is accounted for by the proximity of that market to a large territory where dairying is the prevailing agricultural industry. Taking Toronto alone, the receipts for the four months named include about 50 per cent of the year's supply. It is unfortunately true that a large proportion of the spring calves received, more especially at Montreal, but also to some extent in Toronto, are of exceedingly poor quality. Before the advent of federal inspection in 1907 very large numbers brought in were less than one week old and a certain proportion of these still find their way to the market to meet confiscation or be disposed of through local uninspected slaughter houses.

Of the calves, three weeks and over, which make up the great bulk of the offerings there are several classes ranging from prime veal to very inferior stock. The stretch of quotations in the market reports, especially during the spring months, indicates the range of quality. From two to ten dollars per head or from six to nine dollars per cwt. are common quotations and tell a striking story.

Veal may be roughly classed as heavy, prime and common. Heavy calves may again be subdivided into fat and rough. While the former bring a better price per pound than the latter they are by no means as desirable to the trade as prime veal. A calf weighing more than 200 lbs. is not wanted by the butcher unless at special seasons of the year, such as Christmas or Easter, when a striking display in the shops is desired. Unless a calf is disposed of before it passes that weight it should be carried on for beef. Old or heavy veal not only cuts too large but is tough, coarse of grain and of bad colour, being too dark for veal and too pale for beef. This is why heavy calves are undesirable and cannot be sold at a profit. When prime veal calves are selling at $8 per cwt., even well fattened heavy ones bring about $5, and those thin in flesh correspondingly lower. These figures represent the relative values in Montreal and Toronto while in Chicago and Buffalo the difference in value is even greater. According to the figures of market authorities the proportion of prime veal to lighter calves is not more than from 5 to 10 per cent of the total receipts.

A Prime Veal.

A prime veal calf must have two qualifications. It must be between the ages of four and eight weeks and be well fattened. In addition it should carry a good depth of flesh on the back. This last named qualification is more a matter of breeding than fattening. That is to say a calf from a sire of a beef breed would yield a more fleshy carcass than one from a dairy bull. Of the ninety thousand or more calves received at the two leading markets of Canada the number of prime veals is comparatively small. Perhaps six per cent command a premium over the top quoted market price.

The percentage of good calves, but not prime, probably reaches thirty per cent, leaving more than half inferior specimens unworthy of a place in a well provisioned butcher stall.

A good veal weighs from 100 to 200 lbs., a prime specimen ranging from 120 to 160 lbs. A well fattened veal calf dresses from 65 to 70 per cent with the skin on, in which condition it is usually sold. The meat is juicy, fat, finely grained, white and firm. The fat is firm and almost pure white. Prime veal properly prepared is a delicious article of diet and is at all times in demand.

It is important that one who attempts to raise veal understands how to judge when a calf is at its best. Its head should be comparatively small as compared with the body and have a sleek appearance. The neck or 'scrag' should be thick, brisket full, ribs well covered, loin wide, flanks full, points of rump plump and meaty, thighs plump and scrotum or udder full. It should have a generally firm touch all along the back, and a sleek mellow skin that will easily lift from the body. A calf with such points is ripe for the market, is sure to give a good carcass of veal, and if carefully moved and dressed is sure to cut up delicious, inviting, light coloured veal.

The Common Calf.

The common or inferior calf, that practically floods the market in the spring of the year is a scrawny specimen, carrying comparatively little flesh and that of inferior quality. The high price of milk in recent years gives many the impression that it is too valuable to feed to calves in its whole state, with the result that after the first few days the calves on many farms get little more than skim milk. They are then turned over to the first buyer who will take them at whatever price they will bring. Before the days of meat inspection, no calf was too young for the market, but the risk of confiscation has largely put a stop to the marketing of very young calves. While much of the 'bob' veal went into cans a large quantity was sold over the counters of meat shops marked in many cases at so low a price as to be readily taken by the poorer buyers. Then there is the skim milk calf perhaps old enough to be thoroughly wholesome but of such poor quality that the buyer is not likely to repeat his order for some time.

Inferior veal whether from very young calves or those insufficiently fed is a poor article of diet. In appearance the flesh has a bluish tinge while the fat presents a dull yellow appearance. It is unfortunate that it should be ever offered for sale under the guise of good veal. It is from eating such that veal has become to many a very undesirable food. True it is that cheap veal in the spring months is a blessing to many of the very poor in larger cities who are not able to pay the usual high prices for beef, pork and mutton prevailing at that season of the year. It is also true that if much of the lean veal sold were properly fattened the demand for it would greatly increase and this would at once enhance the value of good calves that would then assuredly pay for the milk and other food that would be necessary to fatten them. Since very young calves no longer pass inspection they must be fed for at least three weeks on something and unless this is good food a satisfactory price cannot be obtained for them. Calves weighing less than 100 lbs., unless fat, should not be marketed as they sell for a sharp discount. By feeding veal calves judiciously until weighing 120 or more pounds a satisfactory price is assured.

There is no doubt but that the consumption and consequently the demand for veal would increase rapidly if more good veal were offered. In Chicago, where federal inspection has been in operation sufficiently long to teach the consuming public that veal is good meat, the consumption of this meat has increased from 7 to 10 per cent. It is confidently believed that the illimitation of underweight calves is in large measure responsible for this. In Buffalo, practically the same condition of affairs exists. During a visit to the East Buffalo market in the spring of 1909 it was learned that fully 50 per cent of the calves marketed were fattened veals possessing more or less quality. In spite of large receipts this heavy supply of fine veals did not meet the demand, the price for such for several weeks being around $9 per cwt. live weight. In Canadian city markets high prices are almost always available for prime calves of right ages, dressing about 70 per cent but so few are offered that they do not figure in the regular offerings. Let the quality improve and there will be no difficulty in regard to the price which will pay well for the feed if judiciously provided.

The Toronto market consumes a large quantity of veal the year round. In the shops of one firm and the St. Lawrence market taken together the output runs from 1,000 to 4,000 carcases per month. The supply is lowest in December and January and highest in May, the increase and decrease being gradual between these periods. At all seasons, except April, May and June, good veals bring 10 cents and upwards per pound by the carcass. Values in Montreal for good calves are much the same, although the proportion of prime to inferior veals is much lower than those received at Toronto.

Division of the Carcass.

Veal like lamb and pork requires no maturing on the hooks. It should never be allowed to acquire the slightest taint as it renders it unwholesome and unpalatable. The hind quarters yield the choicest meat. The fillet, loin, leg, breast, shoulder and best part of the neck are the best for roasts. The neck, breast and knuckle are more usually stewed or boiled. The loin and ribs are cut into chops. The legs and ribs are made into cutlets. The lower part of the leg, or knuckle, is sold for soup pieces, stews, etc. A fillet of veal is the leg piece with the bone removed. The udder or firm white of the fillet is much used by French cooks instead of butter. The head and feet of the calf are valuable articles of food. The head should be sold with the hair taken off. The skin should have a healthy look, seem firmly attached; the eyes look bright and clear. If the head appears yellowish it is inferior and will bring a less price. In cleaning the head, care should be taken to remove the brains before scalding it. Calves' brains are a great delicacy. The feet are very rich in gelatinous substance. They should be scalded, scraped and made to look clean and nice, when they are ready for sale. Calves' haslet comprises the heart, liver and lights. Calves' tongues are considered fine, and always sell well.

Sweetbreads are the glands (pancretic) that assimilate the oily portions of the milk. They are located, one in the lower part of the throat and the other near the heart. The latter is the choicer, smaller and more nearly round. Sweetbreads are found in the young calf that is fed on the mother's milk until it has been turned out to grass, when they waste away, no longer being in use, or become tough, and lose their delicacy.

How to Fatten.

The natural diet of a calf is its mothers' milk in the whole state and undoubtedly the best veal is made at the udder. This system of fattening is expensive when the effect on the cow is considered. A lusty calf will undoubtedly drag a cow down in five or six weeks which will have an ill effect upon her production for the season. This is really the expensive part of making veal; by allowing the calf to suck the labour is reduced to a minimum and the top price for the animal is assured. Dairymen fortunate enough to secure city or condensery prices for milk cannot make veal production a regular business but with good management many factory patrons find the vealing of calves profitable. The milk of a 25 lb. per day cow for five weeks is worth about $8 at the factory. Deducting the labour of milking and hauling this is reduced to about $7. A well fatted calf at six weeks old, brings in average seasons, from $14 to $16, leaving a nice margin of profit for the veal.

To avoid injury to the cow for her season's milking the calf may be fed from the pail. By this method some of the cream may be saved by substitution. On no account should the veal calf be deprived of whole milk fed at the body temperature before it is three weeks old. At that age a pint of separated milk may be substituted for a like

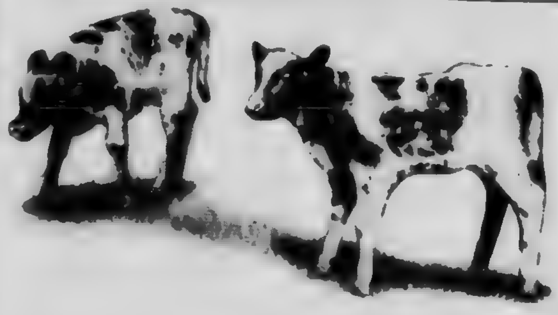
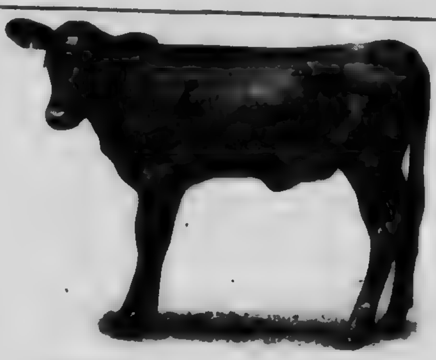


Fig. 32.
Calves four weeks old.

Fig. 33.
A Good Veal Calf.



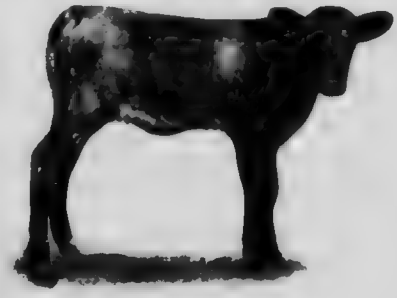
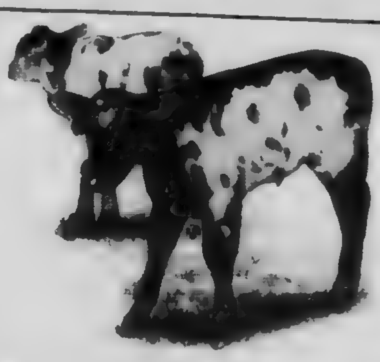


Fig. 34.
A Choice Veal Calf.

Fig. 35.
Inferior Calves.



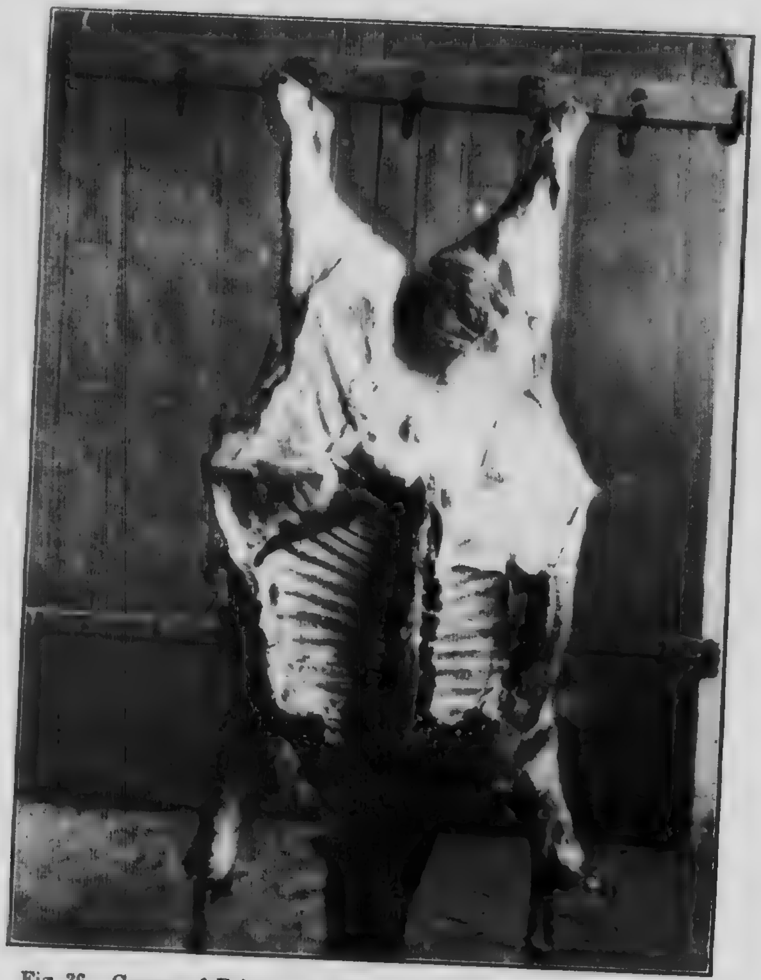


Fig. 36. Carcass of Prime Veal Calf. Total weight, 90 lbs; skin, 8 lbs.; bone, 25 lbs.; meat 57 lbs. Meat of fine quality.

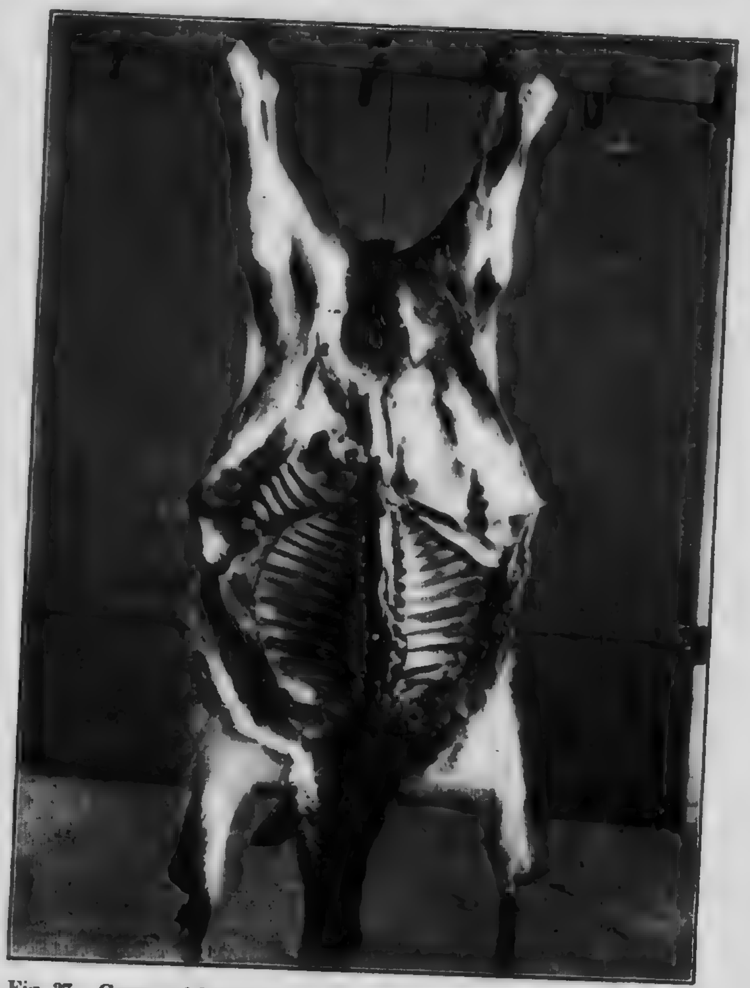


Fig. 37. Carcass of Common Veal Calf. Total weight, 55 lbs.; skin 6 lbs.; bone, 22 lbs.; meat, 27 lbs. Meat of inferior quality.

quantity of the whole milk and to the mixture added a small quantity of flax seed jelly. For one calf a dessert spoonfull of flax seed is simmered—not boiled—in one pint of water until the mass becomes a jelly. This added to the milk constitutes an ecomonical substitute for the cream removed. From time to time at intervals of a few days the substitute may be increased until in six weeks the ration is not more than half whole milk. In all cases the food should be warm. Feeding should be done three times a day, and overfeeding carefully avoided. Experimenters have found profit in adding a tablespoonful of soluable blood meal to each feed of milk and flax jelly. The blood meal has a very favourable influence on digestion.

Very good veal calves may be made in four or five weeks. Under test a calf fed whole milk for four weeks made a total gain of 70 lbs. The calf thus fed should receive not over 16 lbs. of milk per day at the end of the fourth week of feeding. The experimenter concludes:—

'Probably a month is as long as it is advisable to feed calves on whole milk on a dairy farm, or until they have reached about 160 lbs. live weight or 96 lbs. of veal. This may be attained in a month, provided the calves are fatted as quickly as possible; but one cannot expect to do it unless the calves are fed three times a day. An effort should also be made to have the calves fat at a time veal commands a high price; otherwise the returns from vealing calves on whole milk may not be at all satisfactory.'

Some cow owners make a business of fattening calves for veal. Instead of milking, they buy, as they are able to do at very low prices, young calves from their neighbours. These they put on the cows until fat and when sold give place to others. This is continued throughout the season. A good cow will feed two calves at a time for a few weeks after calving and make good veals of them. As they are disposed of at four to six weeks old a comparatively small herd will fatten quite a large number of calves during a season. Such a system is hard on the cows and they require to be fed well to hold up in yield and condition. This method is peculiarly adapted for tough milkers, or those inclined to kick, either of which are available in almost every dairy district.

The Future of the Industry.

The veal industry of Canada offers great opportunities for development. Instead of being, as it largely is, a comparatively unimportant branch of the cattle trade it might easily be made a standard well established business. In all towns and cities more or less veal is consumed throughout the year but as a rule it is called for more as a very occasional change than as a more or less regular part of the diet. A very large percentage of people never touch veal in any form, regarding it an inferior class of meat. This is undoubtedly due to the poor class of calves usually sold for killing. One meal of ill conditioned or too young veal is enough to convince many a person that veal is not a desirable food, hence the very general disfavour in which it is held. Federal or municipal inspection is already accomplishing much in Canada, as it has in the United States, in eliminating the unfit calf, more especially of the younger class, but calf raisers and butchers have it in their power to still further raise the standard of the veal offered for sale, and on this more than anything else, depends the development of a growing demand for higher priced veal.

CATTLE FEEDING IN MANITOBA, SASKATCHEWAN AND ALBERTA.

By George H. Greig, Winnipeg.

Under this division we may consider chiefly the finishing of export cattle. True a very large proportion of all the cattle produced in these three prairie provinces are not export cattle, yet the standard of quality demanded is the export market.

No attempt will here be made to deal with the feeding of 'baby beef' or early maturing fat stock show or Christmas market beeves, local markets for such being, as yet, comparatively limited, although, of course, capable of development. This is, however, a trade worthy of cultivation and in the production of high quality show stuff there is opportunity for the exercise of the very highest development of the breeder's and feeder's art.

In almost every district, from east to west, and north to south in these prairie provinces, nature has, with such lavish hand, provided all the essentials for live stock husbandry, that one marvels that every breeder is not also a finisher of export or high quality butchers' stock. Why should any man sell his calves or yearlings, or two-year-olds, until they are ready for the block? Freight charges, one or two commissions, and other expenses are thus added to the cost of producing such a steer, and this expense generally comes off the original producer. Local conditions do, however, sometimes make it imperative that cattle pass through several hands before they are finally ready for the beef market, and here, with double force, the old adage 'well bought is half sold' stands true. The man who buys cattle to feed places the first insurance on his success by the discrimination and judgment with which he purchases.

In discussing cattle feeding, the first thing to be considered is the quality of the stocker. A first-class exporter cannot be made out of a low grade scrub no matter how much feed is put into him. Quality counts. Market toppers are only made out of well bred stockers into whose production has gone abundant feed of good quality, under skilful and experienced management. Reference has already been made briefly to the breeding of the beef animal, and stress has been laid upon the importance of using none but bulls of the right type and of as good breeding as possible. The need of good management and careful oversight of the young calves and yearlings has also been cited, and it now seems superfluous to dilate further on the kind of beast necessary to make a profitable feeder. Suffice it to say he should be well bred and well developed for his age, of the low set, thick fleshed, blocky type, with smooth back, well sprung rib, a good heart girth and plenty of middle. A hornless, or dehorned steer is preferred by most feeders, being more docile, larger numbers may be fed together with less feeding or trough accommodation. Hornless steers are also less liable to injury in feed yards or in shipping. The better condition the stocker is in when placed in the feed lot, the shorter should be the time required to finish him, and generally speaking, the shorter the feeding period the greater the profit.

The age of stockers is also of importance, dependent, however, in some measure on the conditions under which feeding is to take place, and to some extent upon the market for which they are intended.

In referring to the various methods of cattle feeding applicable to the provinces of Manitoba, Saskatchewan and Alberta, provincial boundary lines cannot be used in defining the districts, or areas, in which any one system is followed. For convenience, therefore, let the territory be divided according to the general methods in vogue in each:—

1. *The ranching methods* covering a large area of southwestern Saskatchewan and southern Alberta, extending well towards the centre of the latter province. This practically covers the area in which cattle are run the year round in large or in small herds on the open range or under fence, under what are commonly spoken of as 'range conditions,' in some cases without provision for winter feed, and in others where a supply of hay at least is always provided against a time of need.

2. *The semi-ranching methods* as adopted in such districts as Moose mountain, Dirt hills, Qu'Appelle valley, and in large areas of northeastern and northern Saskatchewan. Here comparatively large herds frequently run under fence or herd in the summer season, provided with cheaply improvised shelters or natural bush shelter during the winters, and fed hay or straw.

3. *The mixed farming methods* as followed in many parts of Manitoba and Saskatchewan and in northern and central Alberta, where comparatively small herds are run on the native or cultivated pastures and given barnyard care, of a more or less highly developed character, during the winter.

1. THE RANCHING METHOD.

1. Under the ranching method proper, until during the last few years, little or no feeding was attempted. The rancher after selecting a location as favourable as possible for his homestead and corrals, generally a good watering place, proceeded to lease from the Government, or acquired, as much grazing land as necessary for his herd.

The range is then divided into winter and summer ranges and the stock duly branded and turned on either under herd or fence. The bulls are herded by themselves until the proper breeding season, about July or August, when they are put with the herd, an average of one bull to 25 or 30 females. Where there are steers old enough— three or four years old—to market, a 'beef round up' takes place in the fall, early or late, depending on the condition of the cattle, the market demand, and the necessity of the rancher. The beef 'cut out' may be exported or simply butchers' cattle, or a mixture of both, together with old cows and worn out bulls, fit only for canners. If some of the steers, even the older ones, are not fit for market, they are simply left to run the range for another year in the hope that by that time they will be 'beef.' The winter range having been protected from summer pasturing, and from fires, is expected to carry the unsold young steers and 'she' stock through the winter, without any additional feed. But through severe losses in the past, every intelligent rancher now recognizes the importance of providing a supply of hay or other fodder against the day of necessity.

The hay usually provided in this region is what is known as 'prairie wool,' which is simply the short, nutritious, upland prairie grass cut on land not mowed nor pastured over the previous year, so that the old dried grass is mixed with the new. It is raked up immediately behind the mower and stacked the day after cutting. The succulence of the newly mown grass is said to be absorbed by the withered grass of the previous year's growth, making the whole good feed. In putting up hay on a large scale a full gang consists of four mowers, two racks, two sweeps and a stacker, requiring twelve men to operate. Hay is not touched with a hand fork except to spread it about on the stack. A complete outfit will mow, rake, sweep and stack from 45 to 50 tons a day. Frequently this work is let by contract at from $1.75 to $3 per ton, measured in stack after settling for thirty days. Bromo grass (Bromus inermis) western rye grass (Agropyrum tenerum) and Timothy are also used to some small extent as hay grasses where irrigation is practised.

Winter Hay Feeding.

Within the last few years, however, owing to changing conditions on the range, due in part to the great influx of settlers preempting the watering places and dissecting the range lands with barb wire fences, winter feeding has been practised in some sections. One plan tried with fair success is known as 'Hay Feeding.' Hay or 'prairie wool' such as above described, is put up in quantities. Feeders are selected, usually three and four or five year old steers. The corrals are located near water and the hay drawn in daily and scattered on the ground direct from the big basket racks into which it is loaded from the stack, one man only being necessary to the team. Tubs with barrel salt and sometimes a little sulphur, are placed where the cattle can always help themselves. Three hundred and fifty head will consume about a barrel of salt a week. Apart from this no other attention is given the steers, and while cattle thus fed do not generally make very great gains in a feeding period of 150 days, a good four year old will gain about 100 pounds, there are always some lusty feeders which will ship well out of such lots, for good butchers', or even exports, while many will hold their own, or a little better, and ship early, say in July, off grass, and thus meet a good market. For finishing such cattle it is well to have pasture which was not eaten close the previous season, as they then eat the old cured grass along with the new, which gives them a full stomach and does not scour. Such pastures give an advantage of at least two weeks over that which is closely cropped.

It is estimated that hay costs about $3 per ton delivered in the yards to the cattle on about a two to four mile haul, and it requires from four to five tons to winter a four year old steer.

At one camp near Didsbury, Alta., visited by a representative of the department, 300 head of four-year-olds were kept supplied with hay, which was stacked from two to five miles distant from the feed grounds, by three men, each with a team and large basket rack, capable of holding from 2,500 to 3,000 pounds of hay. In another camp four men and teams supplied 500 head of four-year-olds, but the haul was not quite so far. In these camps the steers had absolutely no shelter, neither hills nor brush. Open sheds had at one time been provided, but were abandoned as it was found that in cold spells the steers would bunch into these sheds, when the heat generated by their bodies would cause them to sweat and then they would chill on going into the open to feed. Winter hay feeding means giving cattle all they can use; hay, water and salt, each in abundance.

Hay and Unthreshed Grain.

Some profitable feeding has been done, using unthreshed sheaves of grain as the chief part of the ration. Perhaps in this connection the experience of Mr. John Ross, a rancher living northwest of Pincher Creek, Alta., as described by a representative of this department, may be cited. Mr. Ross is both rancher and farmer, breeds all his feeders, and they are good ones, prefers feeding four-year-olds and considers they do best in cold weather. He aims to have them ready for market by the end of March so as to be out of the way of the spring work. He has fed from 80 to 100 head the last three winters. Sheaf oats constitute the chief ration, but during the winter of 1908-9 sheaf wheat was fed. It was late sown fall wheat which did not ripen evenly and would have made low grade wheat. He fed 57 four-year-old steers and 16 spayed heifers of the same age; started feeding at Christmas. The ration consisted of two sheaves of wheat per head each evening, about 20 pounds of native hay in the morning, running water in feed lots and rock salt always available. The cost of feeding may be estimated:—

Labour at $35 per month, including board, about $1 per head.

Grain, say 20 sheaves to the bushel of such uneven crop at 60 cents. per bushel unthreshed on the ranch, about 6 cents per head per day.

Hay at $7 per ton, a very high price, being so near the great mining camps on the Crows' Nest Railway—7 cents per head per day. Making 13 cents per head per day for feed—for 100 days $13, and labour, $1; making a total of $14 per head for a feeding period of 100 days.

No outlay for buildings, sheds, wind-breaks or feed boxes was necessary. These cattle were sold April 1st at $60 for steers and $48 for heifers. The bulk of the steers, with a few culls taken out, would weigh 1,400 pounds, and the heifers, nice, smooth, and even fleshed, from 1,150 to 1,200 pounds. The benefits claimed for this system are:—Fall markets are glutted with grass beef, buyers only want 'tops' and are in a position to dictate both as to price and selection. In the spring prices are better and conditions reversed; sellers have more to say as to selection and price. Besides, range area is being reduced and cut up by settlers and 100 head of matured cattle require as much grass to finish them as would carry twice the number of young cattle, as well also as relieving the winter range by the number put into feed lots.

Sugar Beet Pulp.

Feeding sugar beet pulp is being experimented with in the immediate neighbourhood of the Knight Sugar Company's factory at Raymond, Alta. When the factory is in operation the pulp is dumped into a large lumber-lined open pit where it remains without cover until the coldest winter weather is past. Towards the end of March the cattle are taken in off the range and penned in open yards near the factory. The pulp is drawn from the pit in wagons and shovelled into the feed boxes. (Beet growers can procure this pulp at from sixty-five cents to a dollar per ton.) At the time the representative of the Department visited Raymond, early in April, 1909, 800 head of rather rough, coarse steers were being fed. A liberal supply of pulp and straw was kept before the steers all the time and, in addition, they were fed some well saved timothy and a little alfalfa hay, together with a light grain ration of from two to three pounds per day. The feeding period is from 90 to 100 days during which time they are expected to gain from 250 to 280 pounds and be ready for market towards the end of June.

Alfalfa.

As irrigation becomes more generally introduced throughout southern Alberta, the growing of alfalfa hay will doubtless become a great industry, as from experiments already made it does remarkably well in this district. When alfalfa is grown on a large scale, it will undoubtedly greatly assist in developing a very large feeding industry.

Grain Feeding.

With the rapid settling of the country, vast quantities of coarse grains are produced, which, with the heavy freight charges from far inland points, reduces its market value. This cheap grain, together with the curtailment of the ranges and the improvement in beef prices, has encouraged winter grain feeding. The centre of this industry at the present time may be said to be in the Lacombe and Stettler districts of Central Alberta, although of course, grain feeding is done on a large scale in many other sections of the west. During the winter of 1908-9 upwards of 3,000

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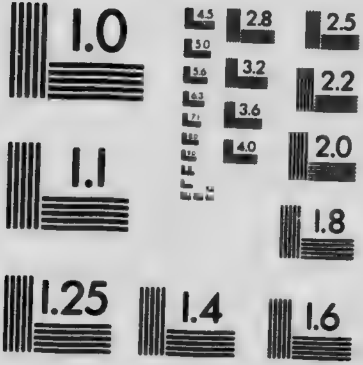

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head of cattle were grain fed in this one district. There are many who feed from 10 to 20 head of their own raising each year, using only such feeds as are produced on their own farms, and others who feed on a much larger scale. Practically all the feeding is done in the open, in yards provided with natural or cheaply improvised shelter. Water must always be available. Well cured native hay seems to make better feed than timothy unless the latter is cut very young. Oat sheaves cut green and oat straw make variety and valuable additions to fodder rations. In a roomy feed lot hay and fodder may be fed scattered on the frozen ground with but little waste, but in soft weather, in spring, there is considerable waste unless fed in racks.

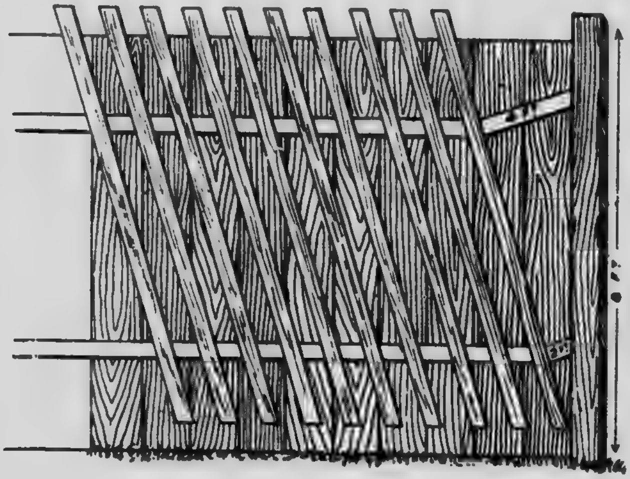

Fig. 38.—An Outdoor Feed Rack.

Fig. (38) shows a good form of hay rack seen in the feed lot of D. Riley, High River, Alta. It is built on the corral fence and made of 1 inch by 4 inch battens, high enough so that the cattle cannot bring much pressure on it. The space of about 6 inches is left open at the bottom between the slats and the fence, which allows the old bottom grass and rubbish to fall.

For outdoor feeding oat chop alone is not strong enough. Cattle thrive better when fed 50 per cent barley chop and 50 per cent oat chop, the percentage of oats to be greater at the beginning of the feeding period and the barley steadily increased during the last 90 days. The method of supplying the grain ration varies greatly; most feeders believe in a limited ration, fed once or twice a day, beginning with from two to four pounds and increasing as the period progresses to from eight to twelve pounds per head per day. A few, including some of the most successful, use the self-feeder or what is called the 'full feed' method, that is, a limited ration is supplied for a short period, say twenty or thirty days, and then the troughs or feeding tables, or self-feeders are filled and kept supplied all the time, and the steers allowed to help themselves. Some of the best cattle seen in the west in the spring of 1909 were finished on this full feed plan. Little or no trouble seems to be experienced from over-feeding. Perhaps heifers or young steers are a little more liable to sicken themselves than four-year-old steers.

A feeding table is made about 3 ft. 6 inches wide, with a 2 by 4 inch or 2 by 6 inch scantling round the edge to keep the meal from falling or blowing off. It should be elevated 2½ or 3 feet off the ground and placed so that the cattle can feed at both sides. A very good feed table is illustrated in Fig. 45 showing the pen of prize winning Galloway steers at the Calgary Spring Fat Stock Show. A 12 foot trough gives 24 feet feeding room, and would accommodate under 'full feed' 100 head of cattle. A feeding trough with small hopper in centre is illustrated in Figs. 39 and 40. This plan prevents the high winds, when the trough is exposed, from blowing the meal away and also helps to prevent waste by the cattle.

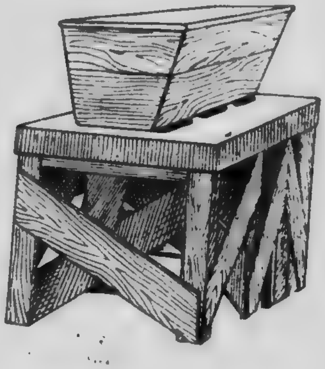

Fig. 39.—Feeding Trough with Hopper. (End view.)

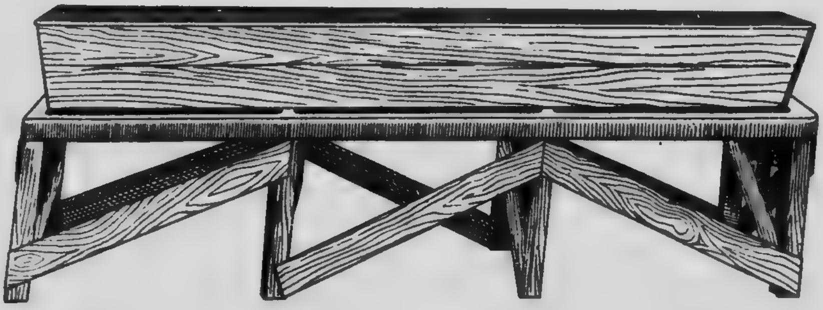

Fig. 40.—Feeding Trough with Hopper. (Side view.)

Contract Feeding.

There are always a large number of mature cattle that from bad wintering, or poor pasturage, are too thin to ship in the fall. The culls from the large droves handled by the big dealers are frequently winter fed on hay or grain, under their own management, but sometimes they are leased out in smaller bunches for winter keep and finishing. Contracts are sometimes made on one or other of the following plans:—

1. To run mature cattle through the winter on hay or straw, $6 per head.

2. To run mature cattle through the winter, giving all the hay they will eat, $12 per head.

3. For grain feeding, 1 cent per pound for the fall weight, and an additional 4 cents per pound for the gain between fall and spring weights. That is, if the steer weighs in the fall 1,200 pounds, and gains 200 pounds, the feeder would get $12 for feeding and $8 for the increase in weight, or $20 for 100 feeding days, which is the stipulated time under such contracts.

4. Another plan which insures liberal feeding and careful selection of well bred steers, is a contract allowing from 10 cents to 14 cents per pound of increased weight, the price depending on the distance from market, which, of course, affects the value of the grain fed. A well bred steer of the right type should in 5 to 5½ months increase from 250 to 300 pounds, so that at even 10 cents, a fair profit is assured. Prices for feed in these districts may be quoted as: Prairie hay, $3 per ton; oats, from 24 cents to 26 cents; barley, 35 cents.

Grain Feeding in the Open.

Out of door feeding does away entirely with the necessity for expensive buildings; it reduces labour to a minimum, one man being able to feed from 80 to 100 head. Cattle so fed thrive well, consume perhaps a greater amount of feed to make equal gains, but their digestion is better; they are more contented (wild range four-year-olds when got on to 'full feed' will lie around yards without getting up on the approach of attendants) and being better muscled than stall fed bullocks, ship with less shrinkage and loss. It must be observed, however, in outside feeding that mature cattle do best; four-year-olds stand the cold better and make more profitable gains than younger cattle. The feed lots should be roomy and the cattle always well bedded; a constant supply of good water easily attainable is an essential. A liberal supply of good hay or fodder, a variety preferable, and a generous grain ration is of greater importance than shelter. A supply of salt should be within reach at all times.

Perhaps we cannot do better here than quote from the valuable experience of Mr. T. W. Bannister, on the Bow Valley Ranch, near Calgary, during the past four years. The cattle here were put in a small yard with open shed about December 10 each year. They were good cattle of uniform type, carefully selected. The yards were kept well bedded and the racks full of hay, native hay, brome grass and oat sheaves being supplied, thus giving variety. After cattle have been in yards a week one sheaf of green oats per head is given in the middle of the day for ten days, then the next ten days 2 lbs. of oat chop per head once a day is added, to be increased the following ten days to 2 pounds twice a day, and subsequently increased about every two weeks. During the last six weeks 25 per cent barley chop is mixed with the oat chop. Water and salt in which a little sulphur is mixed is available at all times. The following are the results of each of the four year's tests —

	Average.
1905—14 steers:	
Fall weight	1,657
Finished weight	2,012
Average gain per head in 90 days	355
Consumed 800 lbs. of meal in test.	
1906—11 steers:	
Fall weight	1,675
Finished weight	2,010
Average gain per head in 90 days	335
Consumed 800 lbs. of meal in test.	
1907—12 steers:	
Fall weight	1,400
Finished weight	1,730
Average gain per head, 100 days	330
Consumed 800 lbs. of meal in test.	
1909—12 Galloway grades (Galloway bull—Shorthorn cows):	
Fall weight	1,290
Finished weight	1,640
Average gain per head, 130 days	350
Consumed 1,050 lbs. of meal in test.	

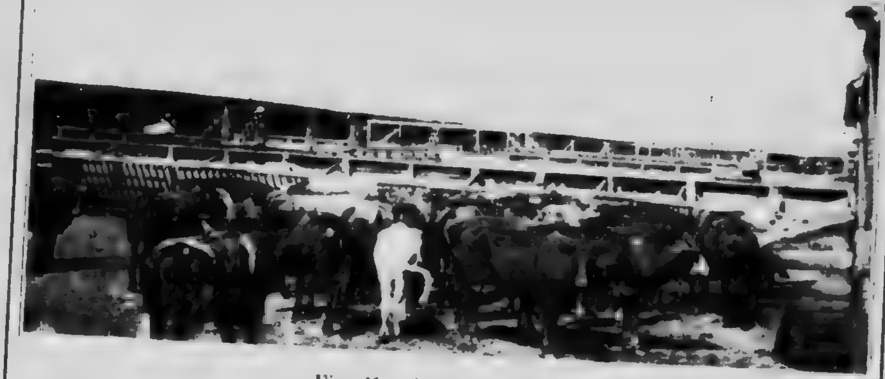

Fig. 41. A carload of culls

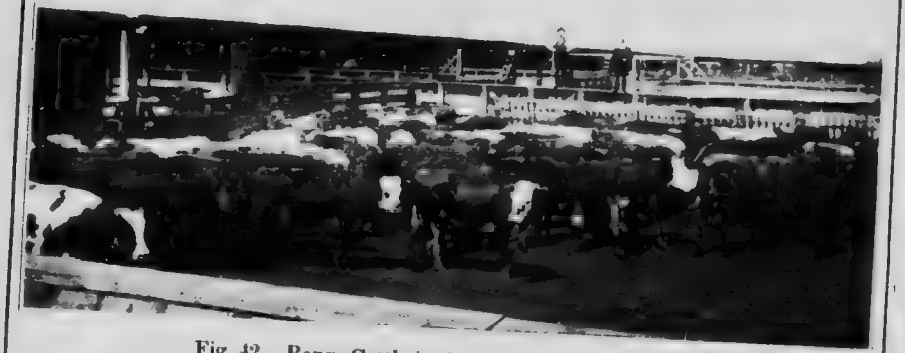

Fig. 42. Range Cattle in the Winnipeg Stock Yards.

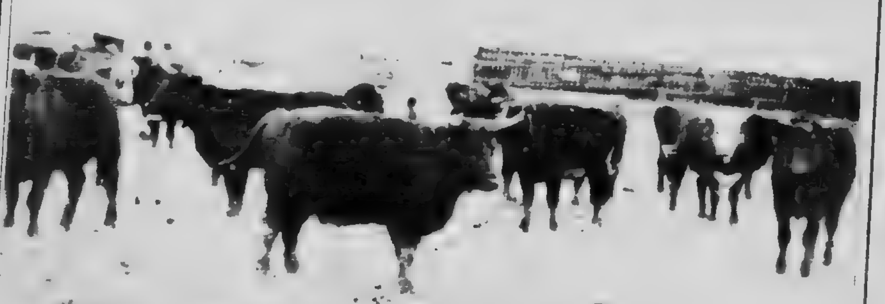

Fig. 43. Group of Spayed Heifers, High River, Alta.

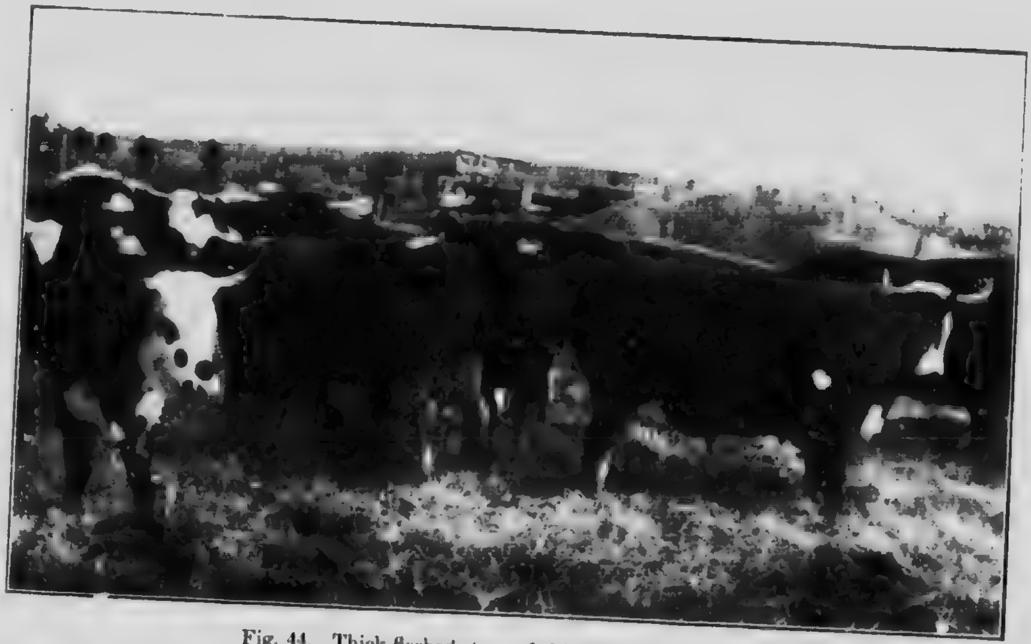

Fig. 44. Thick fleshed steers, fed in the open in Alberta.

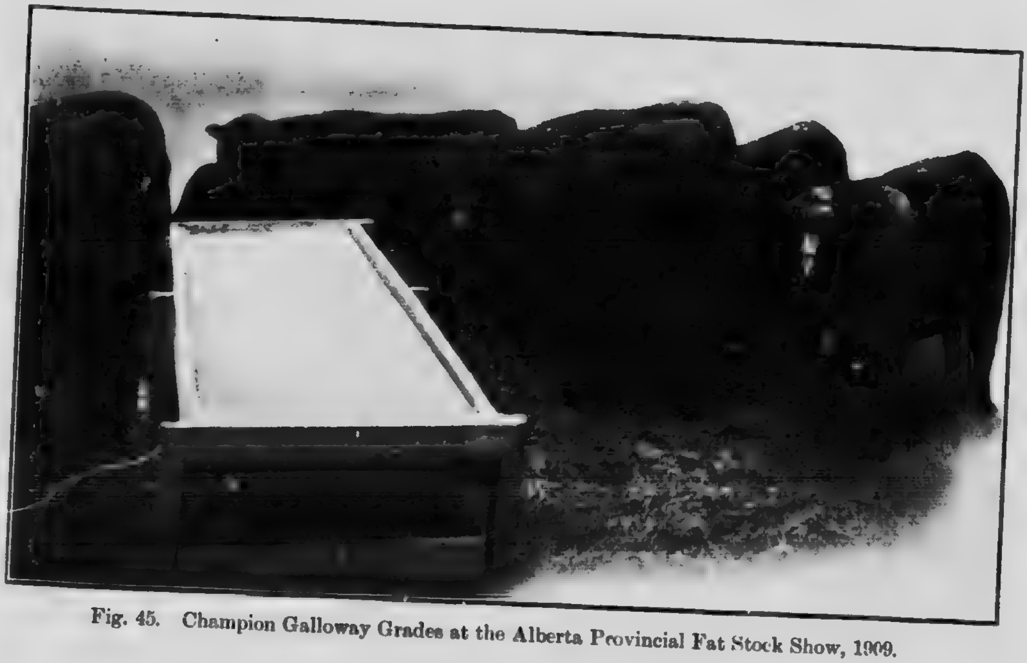

Fig. 45. Champion Galloway Grades at the Alberta Provincial Fat Stock Show, 1909.

Cost of feed and labour:—

1,050 lbs of meal at 1 cent per lb.	$10 50
6 bush. (estimated) oats in sheaf.	1 80
2½ tons hay at $4 per ton (native hay, $3; Brome, $5).	10 00
Labour, $1 per head.	1 00
	$23 30

At the Dunbow Indian Industrial School on the High river, near Okotoks, our representative gathered some interesting statistics. The work is all done by Indian boys, under the direction of the Superintendent. Winter feeding has been carried on for the past 11 years. Cattle have always been tied up in comfortable log stables until this year, 1908-9, when they have done so much better in the open corrals that this method will be adopted altogether in future. In the winter of 1908-9, 300 head, mostly four-year-olds, were fed. They were weighed in the fall and fed till May 1 under a contract of 13 cents per pound for the increased weight. They were fed native hay at $3 per ton in stack, with a little oat straw in December and January. Hay was fed on the ground three times a day. Meal, one-third barley and two-thirds oats ground fine, was fed once a day in long open troughs. Water was always available in river adjoining yards; salt was always before them. The shelter consisted of close board fence round corrals protected by the high banks of the river.

Rations:

Hay all they could eat, 150 days, 3 tons at $3.	$9 00
Meal from Feb. 15, from 5 to 10 lbs., 75 days=6,301 lbs.	$6 30
Cost of feed.	$15 30

An average gain of 200 lbs. at 13 cents, would yield a profit of $12.70 on cost of feed.

Fourteen head of fairly select three-year-olds were fed loose in old log stable, let out for exercise and water every day, and fed 3 tons hay and 766 lbs. meal per head. Meal was fed three times a day as follows:—

January,	30 days	at 5 lbs.	per head.	150 lbs.
Feby.	28 "	7 "	"	196 "
March	15 "	10 "	"	150 "
"	15 "	18 "	"	270 "
				766 "

These cattle averaged 1,388 lbs. and were exhibited in prime condition at the Calgary Spring Fat Stock Show. *See* Fig. 45.

The following figures were furnished by Mr. W. E. Ross, Lacombe district:—Mr. Ross keeps about 140 head, raising 20 calves a year. He has been winter feeding for 14 years; abandoned inside feeding, finding it unprofitable on account of the labour involved. The winter of 1908 he fed 50 head, 32 of which he bought in the fall, three and four-year-old steers. He has hill and bush shelter. He started feeding meal December 15 and expected to feed for 135 days. He estimated each steer would consume three tons of hay and 650 pounds of meal. Sixty tons of hay were purchased at $3.50 per ton delivered in feed racks. Meal cost 90 cents per cwt. Being 20 miles from market expense of crushing equals cost of hauling to market; 50 cents per head would cover cost of salt, opening water holes, etc. This makes a total of about $18 per head for hay, meal, salt and labour. He paid $33 per head with a 5 per cent shrinkage for the steers purchased in the fall and sold for early May delivery on the following basis:—

Steers over 1,400 lbs.	$5 00 per cwt.
" between 1,300 and 1,400 lbs.	4 75 " "
" under 1,300 lbs.	4 50 " "

Mr. Ross expected to make $16 per head out of the lot over and above the cost of feed and labour.

A very interesting article contributed by Mr. W. F. Puffer, M.L.A., Lacombe, who has had large experience, fully describes what he considers the best method of feeding.

Intensive Fattening.

By W. F. Puffer, M.L.A., Lacombe.

In the district around Lacombe and Red Deer, and in fact in that part of the province generally spoken of as Central Alberta, the winter feeding of cattle is becoming quite general.

There is still plenty of grass throughout this district but the farmer and homesteader is already occupying considerable areas. The country is somewhat rolling with abundant water, and dotted with frequent groves of poplar and some spruce, affording excellent opportunity for winter feeding in the open without the expense of stabling.

The method of feeding which is now being generally followed and which, after an experience of twenty years of cattle feeding, most of the time in Alberta, I have myself found to give the most satisfactory results, I will describe briefly. First, let me say that I strongly favour feeding in the open, and that I am convinced that many of those who attempt feeding cattle do not feed grain with sufficient liberality to obtain the best results. This, I believe, is one reason why Canadian cattle are generally quoted on the Liverpool market 1 cent per pound lower than United States' cattle. In the United States' feeding districts, cattle are put on a full feed of corn almost from the start, which is kept before them constantly for six or eight months. One hundred bushels of corn is reckoned as the requirement of an ordinary steer during the feeding period. This method gives rapid gains, producing better cattle, which make better prices than where limited grain rations are fed. The disposition of a thoroughly fattened steer is changed; he becomes docile and contented, ships better and thus brings a better price at the end of his life's journey. We have just as good cattle here as in the United States. Chopped barley, wheat and oats are fully equal to corn as a fattening ration, but we must give the cattle all they will eat of it, and when we learn to do this, I contend that our cattle will not sell at a lower price on the British market than United States' cattle.

I have been pleased to note that some good work is being done by the Superintendent of the Experimental Farm at Brandon in outdoor cattle feeding, and I have read with interest reports of other Manitoba farmers who are experimenting along similar lines. I cannot help but think, however, that all these experiments would show better results if they would adopt the method I here describe. At the time the Experimental Farm cattle were sold at Brandon, last spring, for 4¼ cents, which, I fancy, was about their value, a good many cattle were being sold for 4¼ cents, but our best feeders were getting 4½ to 5 cents for cattle for export, and they had to contend with the long rail journey, extra freight and shrinkage, and other expenses, which would make cattle to cost to the dealer in Montreal from 6 to 6½ cents per pound. (For details of this experiment see Experimental Farms' report, also Dr. Rutherford's special report on the cattle trade of western Canada, page 12).

Now, as to the method: Where there is no natural shelter, a corral with a tight board fence about 7 feet high, with a rough straw covered shed for stormy weather is necessary, and even where there is good natural shelter, cattle will do better with a roughly improvised shed in which to lie down during stormy weather. The rest of the equipment consists of racks for holding hay or rough feed, which should always be kept filled, and the cattle allowed access to them at all times. The grain feeding bunks should be placed in the centre of the corral, or in the open, where the cattle can get all round them. They should be about 2½ feet high, 3 feet wide, with 8-inch sides to keep in the chop, and if made about 16 feet long will be found convenient. With cattle not dehorned, and until they are on full feed, about one of these bunks to every 8 head is necessary; after they are on full feed a bunk would accommodate more cattle. Self feeders may also be used and are very satisfactory.

It is perhaps needless to say that attention to the smallest details is absolutely essential to obtain the best results in the feeding of cattle, and this applies just as emphatically with cattle that are being fed in the open, as under the most artificial conditions. They must be provided with plenty of bedding, good clean straw a foot deep; all frozen lumps of manure should be regularly removed so that the cattle may have 'solid comfort.' Remember that when cattle are lying down quietly and contentedly chewing their cud they are making the most money for the feeder.

As above stated, the feed racks should always be kept filled and I always like to supply the best hay at the first of the season before the cattle have got on to the full grain feed.

I find, like Mr. Grayson, of Newdale, that finely chopped grain is best, being more easily digested. Barley and oats ground together is what is usually fed; sometimes oats and wheat, but I have had better results from feeding barley alone. I like to put in three-year-old steers weighing about 1,200 pounds. I begin feeding about the 1st of December 5 pounds of chop once a day, gradually increasing this till about the 15th of the month to 4 pounds, twice a day, which is still further increased until by the end of the month 6 pounds twice a day is being fed. This is gradually increased for the next ten days or so when a little chop will be left over in the bunks; they should then be filled up and never allowed to get empty. I find more grain is eaten the third month than the second. Steers, such as referred to above, will sometimes average 2 pounds per head per day when on full feed, depending on the size of the steer and the quality of rough feed and also, to some extent, on the weather. Steers of good breeding will gain in weight in five months from December 1 to May 1 from 350 to 500 pounds. Such steers will continue growing after the date mentioned until sold, and I am sure no one ever yet experienced any difficulty in getting a good price for such cattle in the spring.

I suppose objection would be raised to the amount of grain fed, but I contend that half-way methods don't pay, and, in my experience, the results obtained justify the extra quantity of grain. On limited rations, steers do not become contented; they remain on their feet too much of the time playing and fighting with others, thus wasting a certain amount of the feed consumed, whereas when put on full feed, even the wildest cattle soon become lazy and lie down a great deal of the time when, as I have already said, they are making flesh economically.

Another important item is the water supply, and it is most essential that water should at all times be available. If water is supplied from a well, a tank heater is a necessity to keep the water in the troughs from freezing, and it will pay for itself in a short time if twenty head or over are being fed. If the water is supplied from a lake or a stream then ample water holes should be provided, and attention should be given that these are made convenient for drinking from so that the animals can stand comfortably. This can be done by making a long narrow opening in the ice, say not over twelve inches wide, and as long as necessary. A little ledge should be left all round the edges of the water hole to keep their feet from slipping in, and the ice should be chopped away at the back so that their hind feet are down almost on a level with their front feet. The ledge round the water hole will also prevent the water from becoming contaminated on warm days. Barrel salt, I find best, and it should not be allowed to get lumpy or hard.

Experimental Feeding in Alberta.

At the Dominion Experimental Farm at Lacombe, Alberta, Mr. Hutton, the Superintendent, during the winter of 1909-10 conducted a very successful feeding test of beef cattle. The description and results of the test are extremely interesting as they show that eighteen steers fed practically in the open air made an average profit per head of nearly seventeen dollars.

Nineteen head of two or three-year-old steers were selected, but one died early in the test, so only eighteen head will be considered. They were a mixed lot of Shorthorn, Hereford and Galloway grades. They were weighed in at an average weight of 1,130 pounds and cost 3½ cents per pound, plus the expense of buying and shipping to the farm. Part of the bunch was started on feed about December 8 and the rest about December 23. They were fed for 109 days and sold on March 30 at 5¾ cents per pound, which is a high price for steers in Alberta. They weighed out on March 30 at 1,318 pounds each, thus making an average gain of 188 pounds each in 109 days, this being a gain of 1·7 pounds each per day for the period.

The ration consisted of upland prairie hay, timothy, and frozen wheat with perhaps 5 per cent of oats and barley screenings. The grain ration for the most part was straight frozen wheat ground. A good deal of it was held over from the 1907 crop and some was so badly frozen that only 37 cents per bushel was offered for it in the fall. Some screenings, probably around five per cent, were also fed with this frozen wheat so that the entire grain ration was practically unmarketable grain. The steers were started on 3 pounds of this ground grain per day per head and by February 25 they were receiving a full feed of around 16½ pounds each per day. They were given just what grain they would eat and clean up nicely. Grain would have been kept before them all the time but they could not stand it. The upland prairie hay was substituted for timothy late in the feeding period because of a shortage of the timothy hay. Little hay was consumed, probably not more than a ton per head during the entire feeding period. During the whole time the steers had access to water and salt at all times and the racks were kept supplied with hay. A tank heater was used, not to warm the water but just to keep it clear of ice.

The steers were fed in an inclosure about 70 feet wide by 80 feet long, with sheds for them to run to if they liked. But they preferred to be outdoors and were scarcely inside all winter. They fed well all winter and at the end of the 109 days were a well finished lot. When slaughtered they dressed out 61 per cent warm and 59 per cent cold, a very good percentage indeed; 55 to 57 per cent being considered a good dressing percentage. In estimating the profits the timothy was valued at $7 per ton, this being the average prevailing price in the Lacombe district. The upland prairie hay was put at $6 per ton, just about twice what the average feeder would want to pay for it. Then the grain was put at 40 cents per 60 pounds, or ⅔ cents per pound, being the market price in the fall, plus the cost of grinding. The labour required and the interest on investment were set off against the value of the manure secured. The cost for shelter was nothing and Mr. Hutton does not think any winter shelter is necessary for fattening cattle in that district.

This experiment has been valuable for several reasons. It has shown, for one thing, that steer feeding may be carried on profitably. Also it has demonstrated that poor grain can find a profitable market on foot. On the basis figured above, the steers returned $1.28 per bushel for all the grain consumed. Two-thirds of a cent per bushel would ordinarily be a little too low value to put on grain, but in this case it was slightly above what the market had offered for it. Figuring results on the basis of nineteen head, the number started with, and deducting cost of steer that died, the net food consumed while on feed for the steer that died, the net profits per head were $14.35.

The following table gives the results:—

Number of steers in lot	18
Gross weight weighed in	20,337 lbs.
Average weight per head, weighed in	1,130 "
Number of days fed	109
Gross weight, weighed out March 30	23,720 lbs.
Average weight, weighed out March 30	1,218 "
Total gain in 109 days	3,383 "

Average gain per head..	188 "
Average daily gain per head..	1·72 "
Average cost per 100 pounds gain..	$7.42 cts.
Value per bushel of frozen wheat fed and marketed as beef..	$1.28½ "
Interest on investment for buildings and necessary shelter..	00 00

COST.

18 steers of weight 1,130 pounds, at 3·658 cts. per lb.. ..	$744 01
26,216 pounds prairie hay at $6 per ton..	78 65
9,123 pounds timothy hay at $7 per ton..	31 93
20,810 pounds frozen wheat chop at ⅔ cts. per lb..	138 73
145 pounds salt..	1 75
The cost of 222 hours labour and interest ($18.75) on money invested in cattle is not figured, but it is more than covered by value of manure available for application to the land.	
Total cost..	$995 07

RECEIPTS.

Sold 18 steers, total weight 23,720 pounds, less 5 per cent at $5.75 per 100 lbs..	$1,295 70
Profit on gain of two pigs following steers during last 6 weeks of feeding..	4·75
Total receipts..	$1,300 45
Total cost..	995 07
Total profit..	$305 38
Average profit per head..	16 97
NOTE.—Loss of one steer, 1,130 pounds at 3·658 cents, plus value of hay and chop consumed..	$49 69
Less 51 pounds hide at 5 cts..	2 55
	$47 14
Profit of $305.38, less $47.14..	$258 24
Average profit per head covering this loss..	14 35

II. SEMI-RANCHING METHODS.

There are comparatively large areas of rough, broken land, well supplied with water and nutritious grasses, lying adjacent to or surrounded by great wheat districts, as indicated under the second heading and entitled, for convenience, semi-ranching districts. In most of these sections, native hay is plentiful and conveniently put up and stock can be cheaply wintered in hay-roofed sheds. As a rule not much winter feeding is done; cattle are shipped off grass in fall to the export or butcher's market, or, if not fit for the latter, are sometimes moved into the grain districts to finish. As cattle from these smaller ranches are partly domesticated, they readily accommodate themselves to yard or open air feeding, and, as pure bred bulls are very generally used, the stockers show good breeding and make first-class feeders. Where cattle are fed they are generally handled loose in cheap sheds, as shown in Figs. 46 and 47.

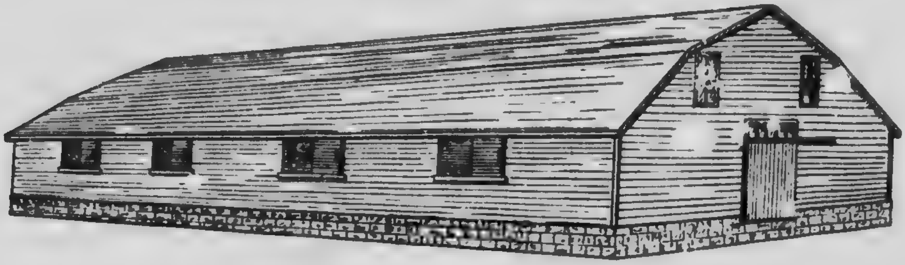

FIG. 46. SHED FOR FEEDING CATTLE LOOSE.

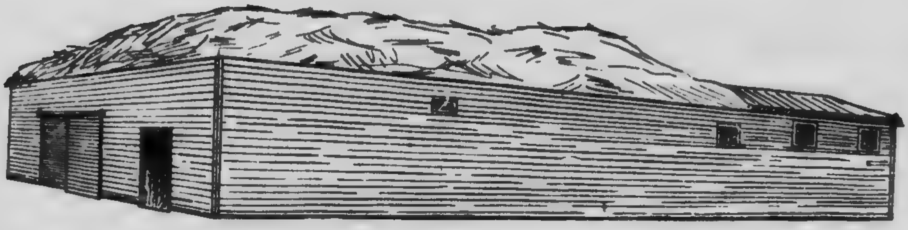

FIG. 47. STRAW COVERED FEEDING SHED.

Fig. 47 shows a straw-covered shed on the farm of Mr. Hugh Kippen, near Arcola, Saskatchewan, in which 50 head or more can be fed. Fig. 6 shows a frame feeding shed on the farm of Mr. W. H. Bryce in the same neighbourhood, which will accommodate about 100 head, all cattle running loose, of course. The latter is a more expensive structure but of a more permanent character.

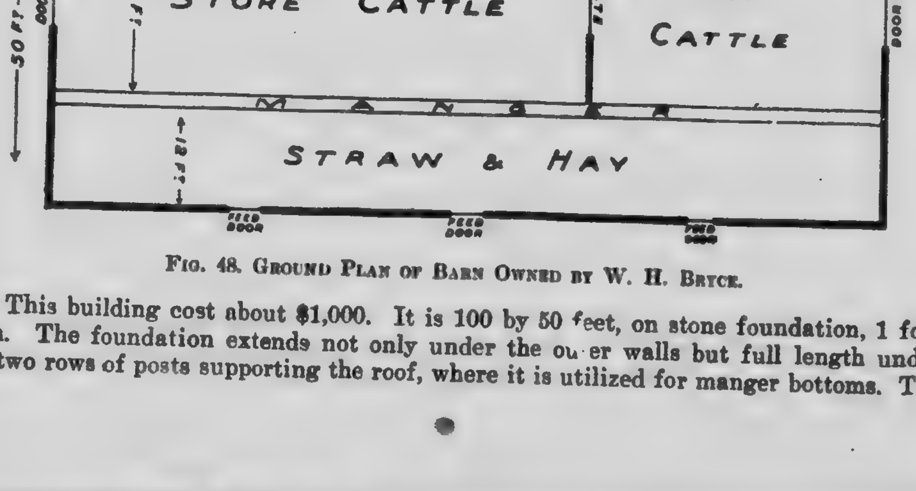

FIG. 48. GROUND PLAN OF BARN OWNED BY W. H. BRYCE.

This building cost about $1,000. It is 100 by 50 feet, on stone foundation, 1 foot high. The foundation extends not only under the outer walls but full length under the two rows of posts supporting the roof, where it is utilized for manger bottoms. The straw or hay is unloaded from wagons through large sliding doors under the eaves, as shown in Fig. 46. After using this shed for several years, Mr. Bryce says if rebuilding he would arrange the interior on the plan shown in Fig. 49. The centre space would hold a greater quantity of fodder and the two 15-foot spaces would provide more accommodation for stock than the one 26-foot space, besides which the building could be much better lighted.

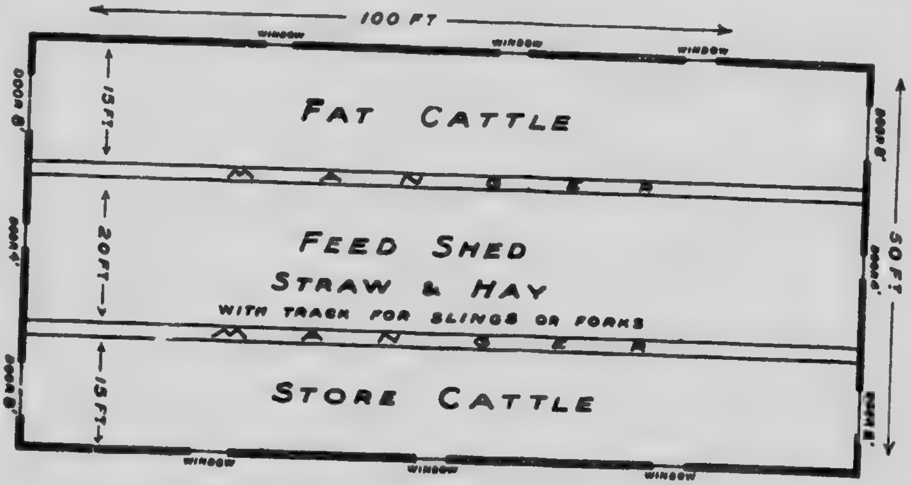

Fig. 49. Improved Plan of Barn Owned by W. H. Bryce.

Feeding.

As to feeding methods, little need be added to what has already been said. Three-year-olds are preferred to twos, as the latter incline to growth of frame rather than flesh. Nearly all feeders favour dehorning. It is always important to keep the grass flesh on the stockers and begin feeding in the fall before they loose flesh, from November 1 to 10. If young, thin cattle are put in they will have to be carried through the long period to May, or perhaps June, to make a good finish and strike the highest market. Those who buy in the fall count on doubling their money on a six months feed, or when buying store cattle of all ages in spring, count on a return of $10 per head per year.

In the districts now under consideration, adjoining, or right in the wheat sections, more straw is fed than is usual in the range areas. Oat and barley straw of good quality, cut a little on the green side, makes an excellent feed. Native hay, however, is still plentiful in many districts, and cultivated grasses are being, year by year, more largely introduced. Owing to the scarcity and high price of labour neither roots nor corn fodder are cultivated beyond very limited patches for use in pure bred herds. Oat and barley chop or wheat screenings are used about as previously described.

Rape for Early Finishing.

Perhaps the most profitable of all methods of finishing cattle is that described by Mr. R. J. Phin, a large dealer and farmer near Moosomin, Sask., in the following interesting article. The cheapness of production under this plan is the interesting feature and providing good pasture the essential, next to the selection of good stockers. The skill, however, of the dealer in buying and selling is here given greater scope:—

'I have handled from 1,000 to 1,200 steers per year for the past few years, and finished fully half of them on our own farm or pastures. On the scale I have been handling them, I prefer to finish as many in summer as possible. I buy almost all my cattle, mostly threes, with a few four-year-olds, in July. If they are on good pasture, buy for fall delivery and secure best grazing possible for the balance. I keep shipping out during the summer everything that is ready. For those that do not finish, a quantity of rape is sown in drills on the summer fallow. It is sown at the end of June or first of July, and cattle are put in about 1st of October. Some grass pasture should also be provided. I begin early to feed meal at night, about a gallon per head at first, increasing as the rape gets eaten down to two feeds daily. I ship out all that are ready by the 15th of November. Those that are not then ready should be reserved for winter feeding.

I have wintered from two to three hundred head during the past few winters. I have fed a few tied up, others loose in large boxes in the stable and a large number loose in open sheds, and last winter, 100 in barn yard. I have grown my own shelter and my yards are well protected. Where there is shelter the big steer can be fed satisfactorily in almost any way so long as he gets plenty to eat and drink. I feed ground mixed grain twice daily and straw, using a larger proportion of oats in the early part and heavier grains towards the end of the feeding period. I buy large quantities, as well as what I raise, and used fully 12,000 bushels last year. Outside cattle get no more grain than others, but they will use up more straw, and should have hay in spring. I have a deep well, 200 feet, piped to the barn and water in stables, and a trough in one of the passage way doors, so that outside cattle can drink from it. I have also a shallow well, tank and heater, and find it works all right.

The best practice for the average farmer, I believe, is to furnish good pasture for all stock he wishes to turn off. It is surprising how few do this. I have some rape when the pasture fails to keep them going and start grain feeding early. It is well to sell early if prices are suitable, if not, feed them for May. A great many make the serious mistake of allowing their cattle to fail until Christmas, and then start to feed. It is easier to keep on three pounds of flesh than to replace one lost pound. In this country it is necessary to feed till May or June to get the best returns, as large stocks of frozen meat are laid in by the butchers in the fall and prices are usually low until May, although there are exceptions.

In winter feeding, the feeder should have an increased price of quarter of a cent per month, that is, steers bought at 3 cents, with four months to feed, should sell at 4 cents or better. Farmers should winter their young steers better. It pays. A very light grain ration added to the roughage makes a great difference. Steers, coming three years old, fed in yards with open sheds for stormy weather, given all the straw they can eat, and about 3 pounds of grain once a day (fed in the evening) will hold their own and be ready to ship off grass early, say about July, when prices are usually good.

I have not dehorned very much, as I often have the cattle only a limited period, but all stock should be dehorned and our domestic cattle should not be branded. Americans always ship dehorned, unbranded cattle. Owing to home demand they are lately able to send forward only second and third-class stuff. Our cattle could easily come in on a level with them if we could only get better railway facilities. The brand and the horn stamp them as Canadians and 'ranchers.' The wholesale butcher on the other side does not like the 'rancher' because he is sure to be bruised more or less, sometimes off colour, and owing to the long periods of starvation, kills out badly, has no kidney fat and little tallow, and consequently brings a much lower price.'

III. MIXED FARMING METHODS.

In the districts devoted to diversified farming, comparatively little cattle feeding is, as yet, being done. In pioneer days when grain crops suffered from frosts, largely owing to lack of understanding of proper methods of soil cultivation, 'mixed farming,' including the breeding and feeding of cattle and hogs, saved the situation in many a district and enabled the settlers to become thoroughly established. In many parts of Manitoba fine stock barns were erected, following the designs of similar structures

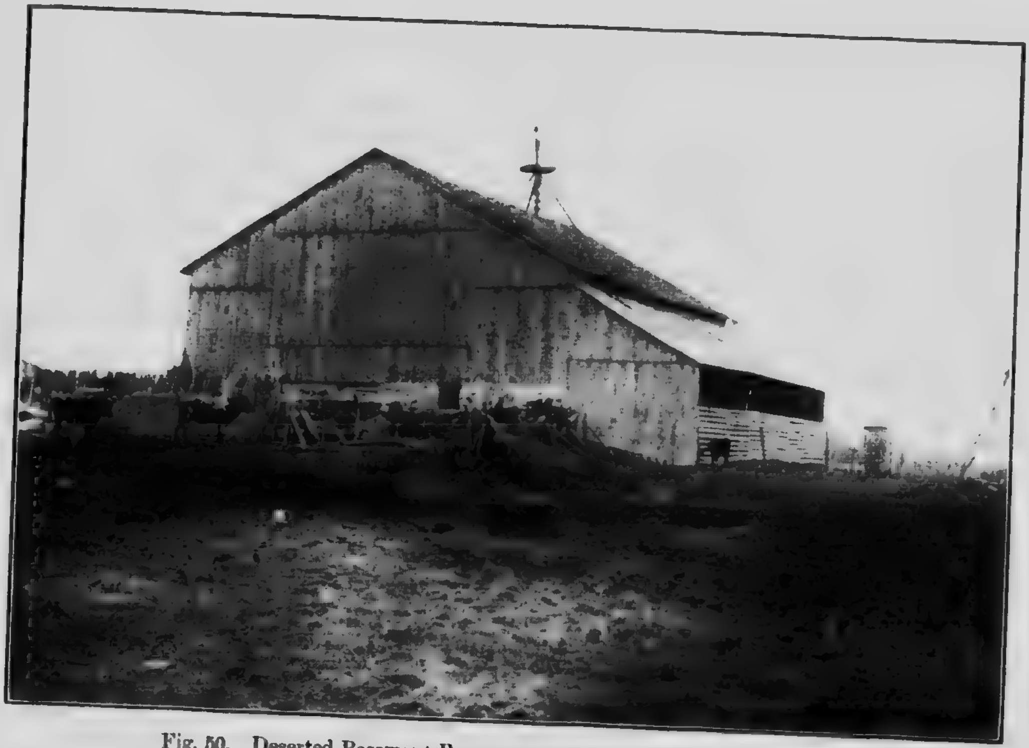

Fig. 50. Deserted Basement Barn, owned by J. L. Cook, Newdale, Man.

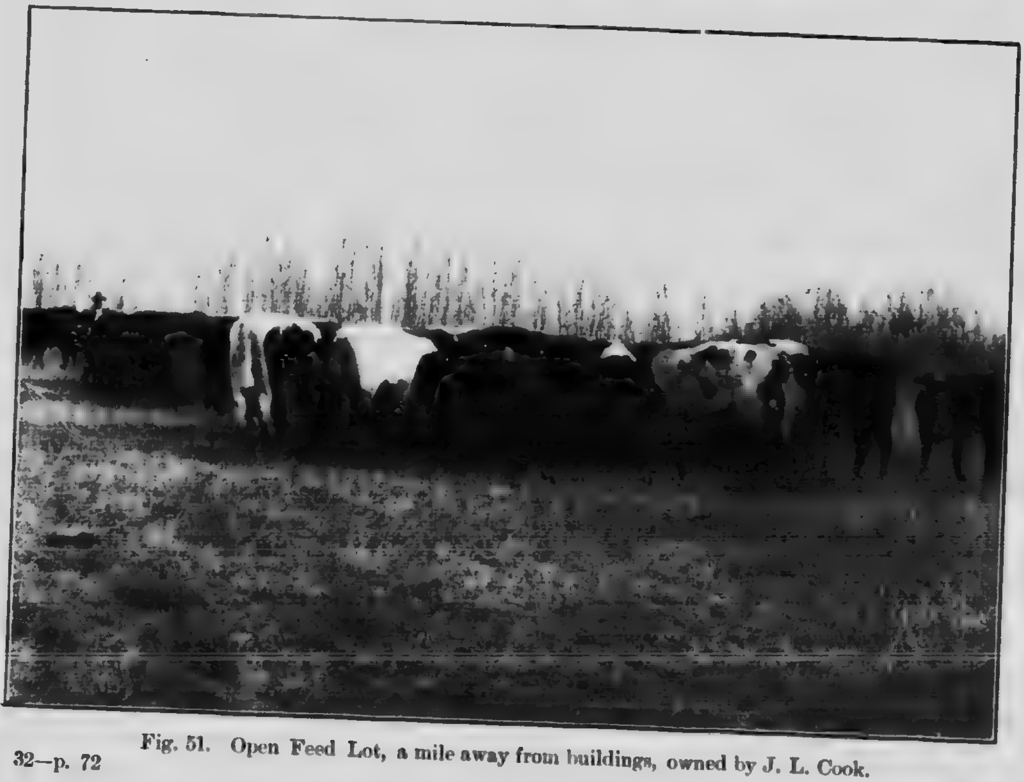

Fig. 51. Open Feed Lot, a mile away from buildings, owned by J. L. Cook.

Fig. 52. Meal time in the open on farm of J. L. Cook.

on the old farms of Ontario and the eastern provinces, even to the fault of being without light and ventilation. Soon, however, with the adoption of suitable methods of culture and the introduction of improved machinery, wheat growing became almost universally successful, and 'mixed farming' came to be a bye-word and a reproach. The reduction of freight rates on wheat, consequent upon the development of the railroads, together with inadequate local markets for surplus live stock, tended to encourage the growing of wheat and to discourage the breeding and feeding of live stock. Pastures were broken up, barns left unused or converted into horse stables, straw piles were burned, 'money came easy' and wheat was crowned King. The Press, the immigration pamphlet, the railroad folder, the merchant, the banker, the land man and the farmer bowed down and worshipped wheat. But it is wheat that is peopling the west. On these rich virgin prairie lands, nothing gives such quick returns for capital and labour invested as wheat. It enables the thrifty settler in a few short years to become a land owner. The crowded peoples of the old lands hunger for that of which we have a surplus—*Land*, and it is in the satisfying that land hunger that Western Canada gets her population and Canada her prosperity.

But continual wheat cropping almost invariably results in impoverished and weed infested farms. Seeding down to grasses and clovers and the production of corn or other soil cleaning crops is the ultimate remedy, and the pendulum swings back to live stock and mixed farming, which is unquestionably the highest ideal in agriculture.

Continual cropping and bare fallowing exhausts the humus which is so abundant in the virgin prarie soils and which is so essential an element in retaining moisture, warming cold, heavy clays and in preventing the drifting of lighter soils. Humus can most readily be supplied to such worn soils through seeding down to grass or by the application of barnyard manure. Through the agency of live stock the grasses can be profitably marketed and manure manufactured as a bye-product. Further, the incalculable waste that is annually practised on the purely grain farm in the destruction of thousands of tons of straw and chaff, can be avoided. Live stock will utilize these products and a safety valve is also provided in case of crop damage from frost, hail or other untoward circumstances.

Manure.

Manure has generally been looked upon as non-essential. The early pioneer had no use for it, but respected it to such an extent that when the pile got too big in front of his stable door he moved the stable, rather than the manure. The early settler had no use for it either; he drew it out and burned it to be rid of it. Even yet it is quite common to hear very intelligent farmers, who have not given it a proper trial, denounce its use as unnecessary and even injurious to our 'fat fertile lands.' Manure is, however, being used in every district from Emerson to Edmonton, and manure spreaders being sold in ever increasing numbers, particularly in the older sections of Manitoba. From evidence at hand a light coat of ten or twelve loads of manure per acre thoroughly worked in, has the effect, even on the richest soil, of increasing the yield, stiffening the straw and hastening maturity from five to ten days. Letters might be quoted from prominent farmers in many districts, but a few extracts must suffice:

A farmer near Carman writes: 'After ten years experience in applying manure, I find wheat ripens from three to five days earlier. I have had better results from the application of manure, than from land that has been summer fallowed.'

From Southern Manitoba another writes: 'Have been applying manure to my farm here for 25 years. With 12 loads to the acre, applied on sod, wheat and other grains ripen on an average five to ten days earlier than on land right alongside not manured.'

Another from near the same district says: 'Ten loads per acre worked in with a barley crop gives the next year a crop of wheat with stiff straw, good heads, ripening about a week earlier than on other fall ploughing.'

From an oat growing section in Northern Manitoba, a well known farmer writes:—'Applied on part of field for barley, result a very fine crop on manured portion, as against untreated portion of field, and ready for cutting eight days ahead of the lighter unmanured crop. Same field sown to barley again the following year, crop nearly doubled on manured portion and matured eight to ten days ahead of that unmanured.'

An Oak Lake writer says: 'Wheat ripens seven to ten days earlier and have noticed this same effect on manured lands for three successive years, but I cannot report any improvement in yield.'

A Central Saskatchewan farmer reports an experience extending over twenty-five years: 'The results have always been beneficial, sometimes showing very little the first year, but better the second and even third and quite noticeable for ten or twelve years. We have noticed particularly that upon fields or parts of fields that had been manured anywhere within three or four years, the crop ripened more evenly and at least four or five days earlier.'

From the heavy black soil of the Edmonton district, a correspondent who applies manure every year on timothy sod prior to breaking it up, writes: 'The quantity, as well as the quality of grain is improved, and this is noticeable for five or six crops. The yield of wheat on land treated was not only greater and of better quality, but stood up better and ripened earlier than did the same wheat sown either on breaking or summer fallow. The yield was larger, of just as good quality and ripened just as early as did the same variety of wheat sown upon timothy sod which had not been manured.'

Undoubtedly barnyard manure, properly applied, not only benefits the yield and quality of the crop, but wheat is even of greater importance, where the season is short, it hastens the maturity by several days. This is not a treatise on soil culture, nor even on general farming, but emphasis is here laid on the benefits of manure as a very strong point in favour of the live stock industry in general and steer feeding in particular. For, as has already been cited, steer feeding can be profitably undertaken on almost any farm that has a supply of good water; straw and roughage, and inferior or damaged grain can be utilized, and the residue, manure, turned to good account; expensive buildings are quite unnecessary, even in Manitoba, as is proved by the experience of such men as Mr. Cook and Mr. Grayston of Newdale, Mr. Clark of Pendennis and many others that could be quoted.

Corn and Roots.

It is not generally conceded that the prairie provinces of the Canadian Northwest are included in what is called the 'Corn Belt.' Nevertheless, it is a fact that the growing of fodder corn is on the increase especially in the southern half of Manitoba. Corn harvesters are being sold in considerably increasing numbers and not a few corn cultivators have been introduced. A splendid 50-acre crop of corn was harvested on one of the dairy farms near Winnipeg last year. Some of the early maturing varieties of flint corn such as the Longfellow, Compton's Early and North Dakota Flint seem best adapted to Manitoba conditions. Corn will not mature sufficiently for seed every year, but good ensilage can be made from even the immature corn by wilting it a few days before putting it in the silo (see the 1908 report of the Dominion Experimental Farm, Brandon). Corn fodder, however, does not as yet play any important part in the cattle feeding industry, but, as more intensive methods are introduced it will in many sections become an important element in the rotation as a cleaning crop and the fodder will be utilized in stock feeding.

Root growing is confined as yet to very limited areas and mostly to farms where pure bred herds are maintained. Roots, either turnips, mangolds or sugar beets do exceedingly well, but owing to the cost of labour in handling do not enter into cattle feeding rations except perhaps in a few isolated cases.

Testimony of Practical Feeders.

We are indebted to a great many feeders and dealers, who, in response to a circular letter sent out during the winter, have furnished much valuable detailed information. Space unfortunately precludes the reproduction of all these letters. From the evidence obtained it would appear that the majority of feeders in the mixed farming areas still follow the old fashioned methods of stabling all fattening cattle, and in many cases, have them tied in stalls. There is, however, an evident tendency to reduce the labour and expense of such methods by feeding in loose boxes and even toward feeding in open sheds or corrals or with natural bush only for shelter.

J. L. Cook of Newdale, Man., after several years' trials in steer feeding in a large basement barn built for the purpose abandoned this method for the open feed lot a mile away from the buildings, on the edge of a ravine with bush shelter only. His 1908-9 bunch of 70 head are illustrated in Fig. 52. Mr. Cook buys his cattle, preferring three-year-olds, weighing from 1,100 to 1,250. Oat and barley straw is his principal roughage with hay for spring feeding. Grain ration is one-third barley meal, one-third shorts, and one-third bran, fed in limited quantities, beginning with 4 lbs. per head per day and increased to 8 lbs. He considers markets too uncertain to put steers on 'full feed' as such cattle would have to be sold when ready. He feeds grain from December 1 to the midddle of June and expects average gains of at least 250 lbs. per head. As to outdoor feeding he says:—

'I prefer feeding in the open with grain fed cattle. Loss is more frequently occasioned with stall-fed cattle being too warm than from being too cold. I always get my best gains with 20 degrees below zero weather.'

Mr. Cook's methods are very similar to those so fully described in Mr. Grayston's article which is herewith appended. The experience of other thoroughly experienced and practical feeders might also be quoted to show that this inexpensive outside feeding can be profitably practised in this climate.

Outdoor Wintering in Manitoba.

By Wm. Grayston, Newdale, Man.

A number of years ago Mr. John B. Cook of Newdale, in connection with the late Dr. Harrison, built a large barn and started somewhat extensively into the business of winter feeding beef cattle. After about three years experience during which time the balance was always on the wrong side of the ledger, another bunch of cattle was bought and fed hay in shelter of the scrub which extends along the north side of the farm, the intention being to bring the cattle to the barn as the weather got colder. The cattle had access to open water in the ravines and appeared to be doing so well that they were left out all winter. A small allowance of grain was added to the hay about March 1. These cattle were sold early in the summer and were the first cattle to net their feeders a profit. Since that time Mr. Cook has continued to feed from sixty to one hundred head of steers each winter, and the writer, as well as others, has done somethting along the same line with satisfactory results. Years ago Mr. Cook's plan was to buy in the fall a bunch of cattle, big, lean steers and thin cows and heifers, almost anything with a large frame that might be made to carry meat. But to-day nothing is selected but steers of good beef conformation and weighing from 1,000 to 1,300 lbs., in the fall, steers that carry a considerable amount of flesh. Experience has proved that the fleshy steer is the most profitable to winter and makes better gains than the leaner one, and we rarely find a steer so fat from the grass that he will not stand a finishing spell with grain. These steers have usually been bought from some regular cattle buyer, a premium being paid for the privilege of selecting suitable feeders.

The steers are usually bought during October and allowed to run on the farms until hard winter sets in. As early as convenient after the steers are bought they are dehorned. Clippers are used for this purpose and a handful of lime is pressed on each stub to assist in checking the bleeding. With the approach of winter the steers seek the shelter and straw is drawn to them.

Many hold the opinion regarding shelter that the cattle retire into the bottom of some thickly wooded ravine or into some heavy bush where they would be almost as much shut in as they might be in some sod building without windows. Instead of this the cattle prefer the high open spaces, with just enough scrub to prevent the snow from drifting over the straw. The cattle enjoy the life and especially enjoy the sunshine so long as the winds are broken from them.

I wish to correct a wrong impression about the manure. Some seem to think that it would be out of the question to gather the manure among the scrub. Now if straw is fed in a comparatively limited open space, until it reaches a depth of two or three feet of straw and manure, it is not difficult to gather up. I know of no better way to convert large quantities of straw into useful manure than by feeding it liberally out of doors to grain fed cattle. In feeding straw it is necessary to use much more than the cattle will eat up clean, as by this means the cattle can always have a comfortable bed, and we aim to have the cattle comfortable.

About the 1st of December, or earlier, if the weather is severe, the cattle are given about four pounds of grain each day. The grain is all fed in the evenings in troughs about three feet wide, eight inches deep and raised about two and a half feet from the ground. The grain ration consists of a mixture of oats and barley chopped (barley principally) and bran, about one-third bran by weight. Finely ground chop gives best results and is most appreciated by the cattle. I usually feed about sixteen hundred pounds of grain per steer during the feeding period, and the ration is increased in January to about eight pounds per steer per day and during April to ten pounds. This is continued until about the 20th of June, when the steers are sold. If the grass becomes good in June less grain is needed at the finish.

In feeding cattle on such a dry ration, watering is of considerable importance. Those who are so situated that cattle can have access to open water at all times are especially favoured for this work; the cattle need to drink frequently and in small quantities. Where water is not so easily available it must be kept in the trough as constantly as the severity of the weather will permit, as a large drink of cold water following long abstinence would chill any animal and cause temporary check to digestive processes. In regard to salt, we usually place a barrel in some convenient place and knock the head in.

In carrying cattle until June, it is a great help if one has hay enough to feed for about a month after the snow goes, and by confining the cattle, so that they will not ramble too far, they can be made to at least hold their own during this trying period. The object in carrying cattle until June has been to wait for a profitable market. If the market, on say the first of April, was anything like equal to the market of June I am sure that good results would follow the feeding of the same total quantity of grain in the shorter period.

The steers are bought when cattle are at about the lowest, a premium over the market being paid for the privilege of selecting steers of approved type. In working out our balance sheet we have been in the habit of charging the grain fed to the cattle at the rate of 80 cents per 100 pounds. This we consider a fair price in an ordinary year. We charge interest, wages, and all necessary expenses and have been able with a margin of 1½ cents per pound between buying and selling price to make an average profit of about seven dollars per head.

In the Wheat Districts.

Many instances might be cited of men right on grain farms, who feed a number of cattle every winter, and of feeders who buy all their feed and still make money at it. A few extracts from the many letters must suffice:—

J. R. Hume of Souris, on a section of land all under cultivation, feeds about 20 head every year, tied in stalls and never let out. Water in front of mangers; feeds oat and barley straw and oat and barley chop, increasing ration as period advances; Adds hay and pulped turnips towards the end of the period; sells about 24th May. As to profits he says: 'As near as I can tell they cost me about 4 cents per lb. when I have them ready for sale. I admit that there is not much money in feeding, but we have the satisfaction of knowing that the cattle consume a lot of stuff that has otherwise very little market value. Land that was manured four or five years ago, is still producing ten to fifteen per cent more grain than land that has been worked under the ordinary grain farming methods. I built a cattle barn with all the latest improvements, a hog and poultry house, besides nine miles of fencing, out of horses, cattle, hogs and poultry. Ask me if it pays to raise stock on a grain farm? I say 'sure it does.'

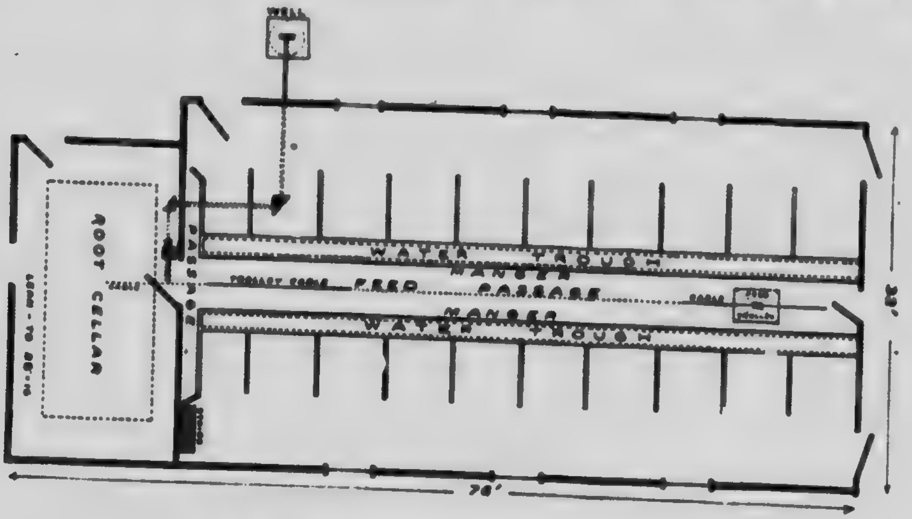

FIG. 58. GROUND PLAN OF BARN OWNED BY J. R. HUME.

A. R. Speers at Griswold, Man., runs about 200 head a year and grain-feeds about 60 head, 'only the best bred and thriftiest'; the balance are sold off grass. He winters 60 to 70 head of younger steers in rough sheds on straw with a little hay towards spring, to finish on grass. During the winter of 1908-9, fed 30 head tied up and 30 loose. Mr. Speers feeds straw, barley preferred, oats next, till March 1, then native hay. He starts grain feeding with half gallon of chop, one-third oats, two-thirds barley, night and morning with half an oat sheaf at noon. After the first month the feed is increased to three quarts three times a day, and after March 1, one gallon three times a day. He grows all his own feed; does not feed roots, but would like to. The feeding period is six months and cattle gain from 200 to 225 pounds. He makes a profit of 1½ cent increase over the feeder prices, but if well finished and sold at proper time generally gets 2 cents. Most feeders want to sell before seeding and consequently glut the market by throwing too many on at one time.

Joseph Donaldson of Brandon, buys his cattle, from 50 to 60 head a year, and all his feed for which he pays the following prices: Oat straw, $2.50 per ton; hay, $8 per ton; barley 35 cents to 40 cents per bushel. He does not use any other kind of feed. He feeds chiefly oat straw and a very little hay. The grain food is mostly barley chop, sometimes a little wheat, or oat chop mixed in; from four to six quarts twice a day. Water is in front of cattle all the time. He selects 2½ to 3½ year old grade Shorthorns, weighing from 1,050 to 1,250. He feeds tied up in warm stables and claims they do better and use less feed than if fed outside. The feeding period is five to six months; average daily gains are from 1½ to 2 lbs. The best season to sell is in May, and the best selling weights are from 1,300 to 1,500 lbs. He considers one should get 2 cents over the feeder price.

Cleaning Dirty Farms.

Some of the farms in the older settled sections have already become very badly infested with weeds. The soil may still be rich in fertility even though it is in bad mechanical condition and full of noxious weeds, and with proper cultivation will produce abundant crops of feed while it is being cleaned. Just how a man can make his living while cleaning up such land is the problem that confronts many.

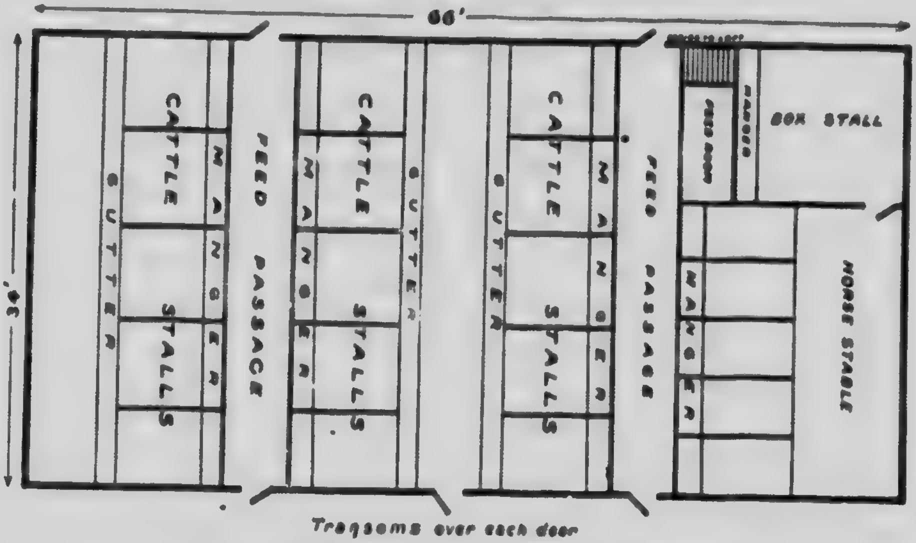

FIG. 54. FLOOR PLAN OF BARN OWNED BY WM. SHARP.

This barn is 34 ft. x 66 ft. with stalls for 30 head of cattle and 5 horses, and a loose box. It cost (four years ago when lumber was cheaper) including painting, but not including the hauling of the material, $,200. The sills are 8 in. x 8 in. tamarack; studding 2 in. x 6 in. fir; upper floor shiplap laid on 2 in. x 6 in. fir joists which rest on 6 in. x 6 in. tamarack girts, supported at stall partitions. The feature of special interest in this structure is the frame, showing self-supporting roof, which does away with the necessity of any posts to interfere with loft or use of hay fork.

Mr. Sharp says that, if rebuilding, he would make very few changes.

Mr. G. H. Bradshaw, Morden, Man., in the following letter describes how he makes steer feeding contribute to his treasury while 'cleaning a dirty farm':—

'We feed from ten to fifteen head each winter, preferring two and three year olds running in weight when ready for market from 1,300 to 1,500 lbs., Shorthorn, Hereford or Aberdeen-Angus are preferred in the order named. I have always fed in stable in box stalls. The cattle are dehorned and run loose, 6 in a pen 14 by 20 feet. I have found they do better than tied up. They have more freedom, get more exercise and rest better. Pens are cleaned out when convenient anytime once in two weeks to a month. Plenty of fresh straw given each day. The tramping of the cattle makes fine manure. Floors of pens are of cement concrete. As I have fine natural shelter, if I wanted to go into business more extensively I would build cheap sheds in a bluff and feed in the open instead of putting up costly buildings. I have fed very little straw, have used almost entirely brome hay, which I grow to clean dirty land. The grain ration consists of one-thtird oats, two-thirds barley, ground up till February 1, and barley meal entirely thereafter, which with the brome hay is very satisfactory. The meal is fed in troughs at the rate of half a gallon per head twice a day for two weeks to start with, increasing to three feeds per day; again increased at intervals of about two weeks till beginning of February, when each steer generally receives one gallon three times a day of barley meal. This amount is never exceeded and sometimes if steers are in fine condition rather less is fed. I have always raised all my own feed and use nothing else but hay and meal. Stock are turned out each day in sheltered yard for water and left out on fine days for a short time for exercise. Sometimes they are given their noon feed of hay or fodder in the open. If cattle are fed loos in pens, dehorning is necessary, and is done with least injury when they are about two years old. When tied up I don't think dehorning is any advantage. I generally put steers in early in November, and feed till sold, sometimes in March, sometimes not until May. As cattle were not weighed when put in I cannot give average gains.

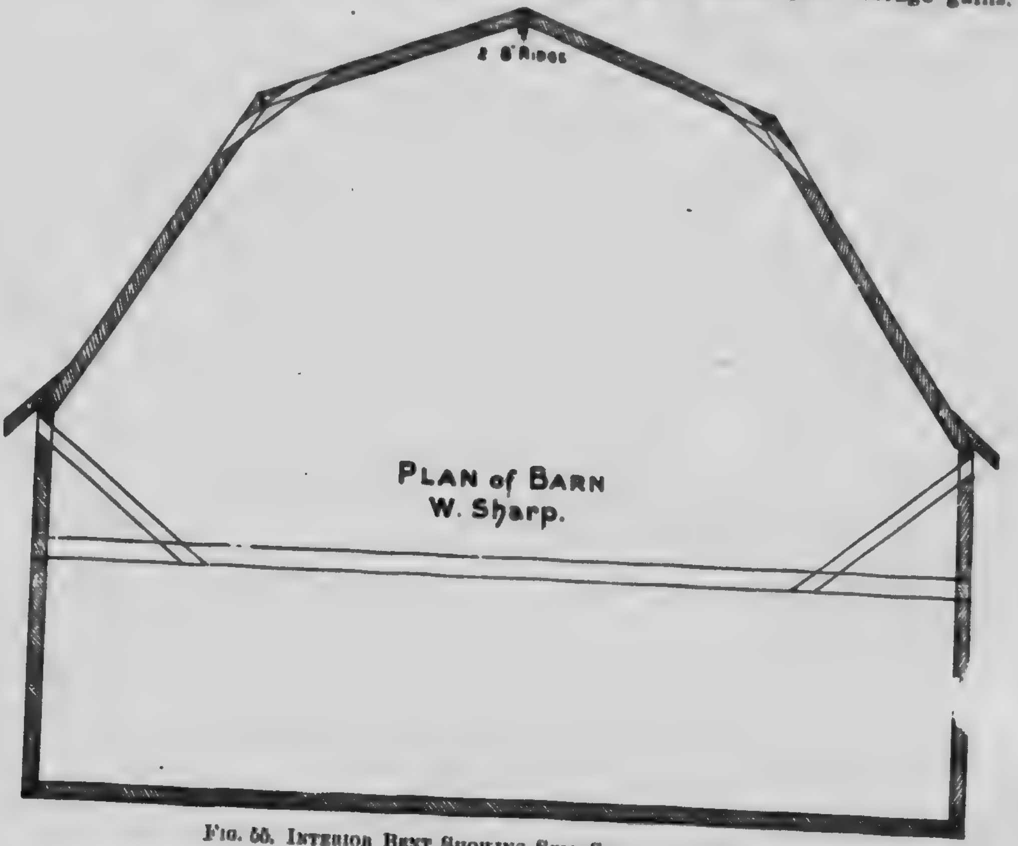

Fig. 55. Interior Bent Showing Self Supporting Roof.
(Barn 34 feet wide.)

I don't think there is any best season to sell. I fixed a minimum price of 4 cents for March delivery 4¼ cents for April and 4½ for May, and find that a margin of $1.50 per 100 pounds on bought steers just about pays for food consumed. In my case I have been cleaning a dirty farm and have taken this method of converting the hay and coarse grains grown in the process into money. The manure returned to the land has also helped considerably.

Buildings.

No attempt will be made in this chapter relating to cattle feeding in the north-western provinces, to discuss in any detail the question of cattle stables. The injury to the health and vitality of our domestic animals through the ill-ventilated and badly lighted stone basement barns of the older provinces is intensified a hundredfold in this climate. The basement stable and the stone wall should be condemned. Stables should be above ground, and ventilated so as to prevent dampness, and be well lighted. Let in the sunlight, let out the foul air and keep the atmosphere dry. It is not the cold that kills but the darkness and the damp.

Expensive buildings are not essential. In fact, in this dry climate, even very low temperatures do not adversely affect mature cattle if provided with abundant roughage, grain and water. The latter is absolutely necessary; with free access to water cattle drink frequently, never taking large quantities at a time, thus their digestion is not interfered with and they do not get chilled as in the case when water is provided once or twice a day only.

Cattle fed altogether in the open acquire a thick and mossy coat of hair; do not bunch together as they will in sheds, and consequently never sweat and do not chill.

The liberty, exercise, pure air and sunshine seem to counteract the effect of lost body heat, and the steer fed outside, while possibly consuming more roughage, will make equal gains to the stall-fed steer with an immense saving in labour, and the capital invested in buildings.

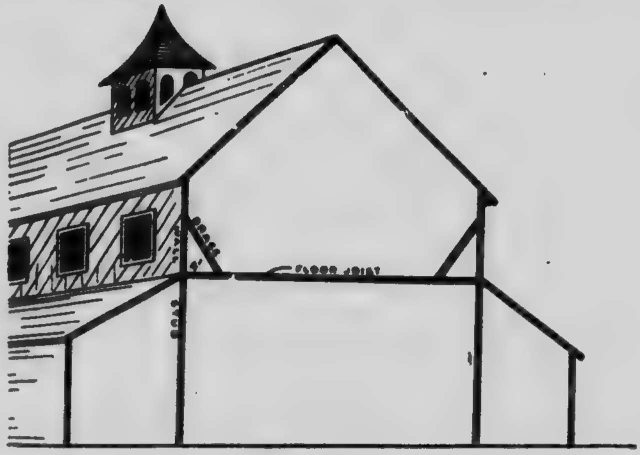

Fig. 56. Section of Barn Owned by Sir Wm. Van Horne Showing how Light is Admitted to Stable.

The lighting system here is ideal, a full row of large windows runs the full length of each side of the building. Braces run from floor joists to wall studs as per sketch, and the loft flooring runs up these braces, thus throwing the light right down into the stable. The windows at this height permit of a leanto which keeps the inner walls dry and warm while providing accommodation for feed rooms or splendid big loose boxes.

The flesh of such a steer is firmer; he is better muscled, and consequently should shrink less in marketing than the stall-fed steer, and be a safer shipper.

More attention should be paid to breeding.

Calves when weaned should be given better care.

Yearlings should be given some grain along with roughage the first winter.

A year's time might be gained in the turn over if the young cattle were better fed.

In the farming sections better pasture should be provided for the stockers. Rape sown on summer fallows provides splendid fall feeding and the tramping of cattle improves the condition of the fallow.

Stockers brought into winter in good flesh, wintered cheaply with some grain may be marketed early off grass when prices are nearly always high.

Summary.

The essentials to profitable cattle feeding are: A good steer, an unfailing supply of water, an abundance of good straw or hay and some grain chop.

For best results select well bred steers of the beef type, in good flesh, two or three years old (depending on the method of feeding.) Dehorned steers are preferable.

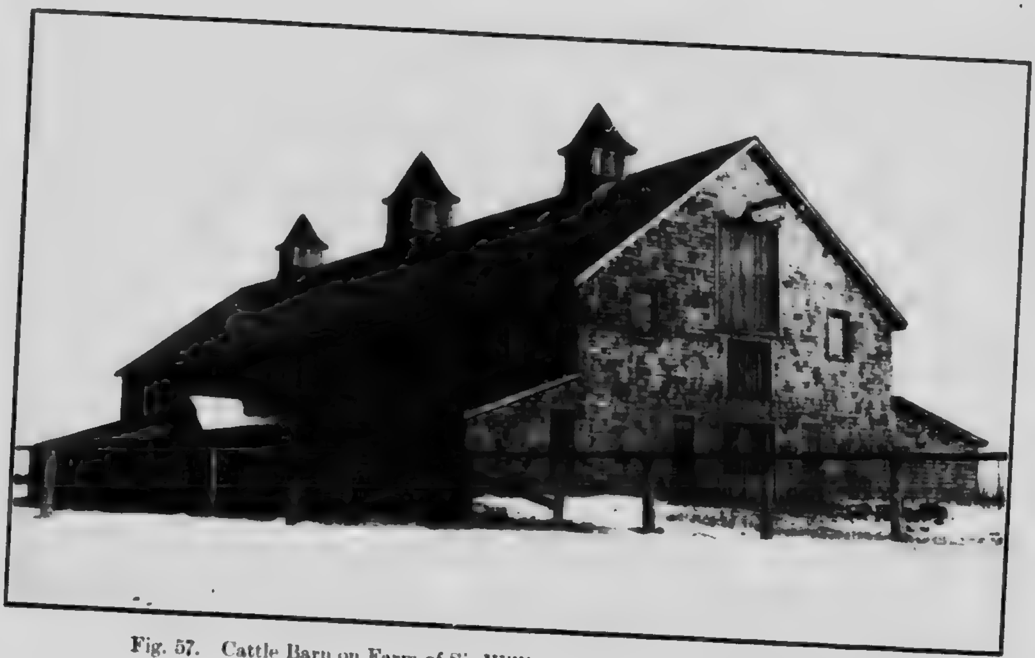

Fig. 57. Cattle Barn on Farm of Sir William Van Horne, East Selkirk, Man.

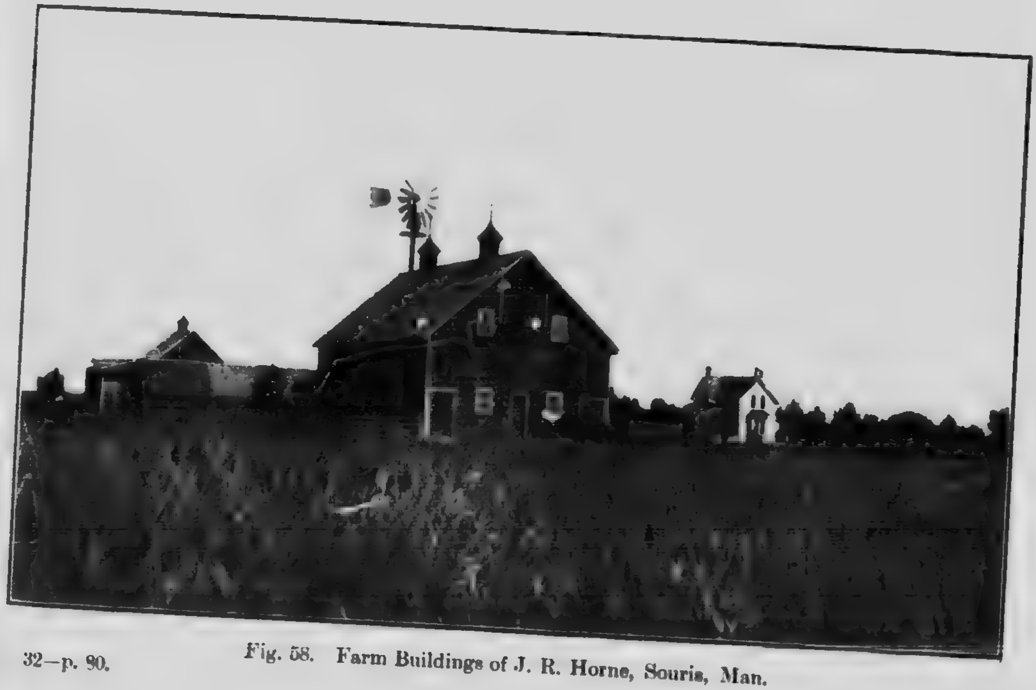

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Fig. 58. Farm Buildings of J. R. Horne, Souris, Man.

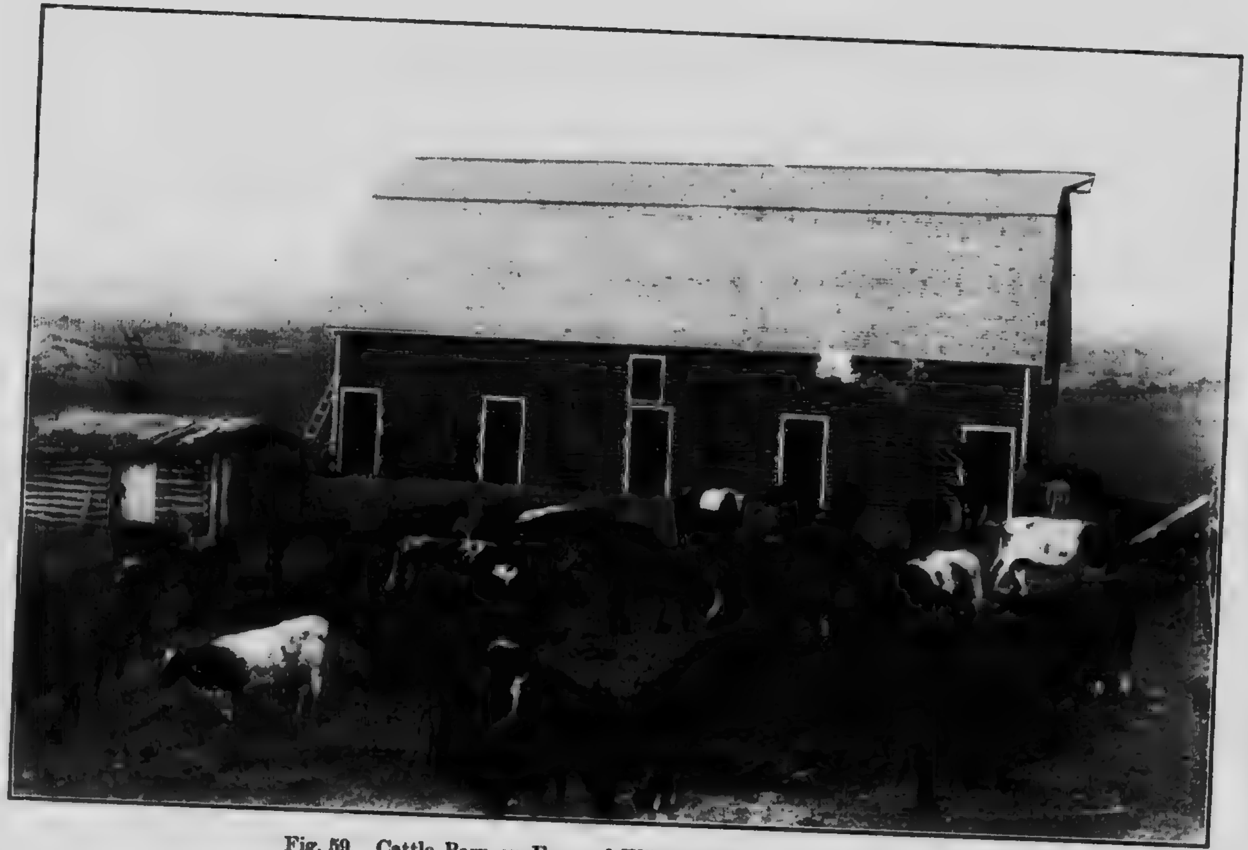

Fig. 59. Cattle Barn on Farm of William Sharpe, Lacombe, Alta.

Profits may be made by feeding either tied up in stalls in stable, loose boxes, in open sheds and corrals or in brush shelter.

Profits may be made by feeding a short or a long period, on a limited or on a 'full' ration; on hay, oat sheaves, or good oat or barley straw, but water must always be available and the cattle well bedded and kept comfortable.

Grain finishing cattle in winter:—

Helps to relieve the market congestion in the fall.

Distributes shipping over longer period.

Supplies the market when most in need.

Provides market for fodder and grain which might otherwise be wasted.

Markets the farm bye-products on foot.

Tends to equalize the demand for labour throughout the year.

Makes manure, which properly applied, hastens the maturity of grain crops, and makes possible the preservation of the soil's fertility.

Markets the cattle when prices are highest.

THE BEEF INDUSTRY OF BRITISH COLUMBIA.

By S. F. Tolmie, V.S., Representative of the Health of Animals and Live Stock Branches in British Columbia.

The first record that we have of the introduction of beef cattle into British Columbia was in the early forties when consignments were brought to the southern end of Vancouver Island by the Hudson Bay Company from their farm in what is now Washington State.

These animals were bred by the company for a number of years near Victoria and they supplied animals to many individuals who commenced farming in the neighbourhood.

During the time of the gold excitement on the Fraser river and in the Cariboo, in the sixties, a number of cattle were driven into British Columbia from Oregon, Washington and California for supplying beef to the miners. About this time several small herds were established in what are now known as the cattle range districts in the interior of the province. Under favourable climatic conditions, and with an abundance of feed, these herds increased rapidly and their surplus animals soon made a reputation for British Columbia bunch grass beef, which, for richness of flavour and fine quality, cannot be excelled anywhere.

For many years the ranchmen suffered on account of poor marketing facilities, often driving their stock for many days to some point on the Fraser river where it was possible to ship to the coast markets. Placer mining strikes at different points in the interior, from time to time, during these pioneer days provided the ranchmen with a good market while the excitement lasted, and some of them, who are now very comfortably situated, can trace the beginning of their prosperity to the market created by these early day mining camps.

With the building of the Canadian Pacific railway, matters were entirely changed, since then the ranchman has been able to dispose of all he can produce, though sometimes at prices not as remunerative as he would wish.

Of late years the beef industry has not been making much progress, and on the coast has practically been abandoned in favour of dairying, which, under existing conditions and prices, is much more profitable, giving the farmer a regular income, and, with the demand for dairy products at present, he is placed in a much more independent position when marketing his produce.

In many districts of the interior too, large tracts of what was once ranch land is being cut up for orchard and other purposes so that at the present time the British Columbia ranchman does not nearly supply local demand.

The first record we have of pure bred cattle coming to the province was in 1867, a pure bred bull coming from California in that year, more were brought from Oregon in 1873, and a consignment came from Ontario in 1874. As might be expected all of these were Shorthorns. There are at present several herds of pure bred Shorthorns and Herefords and one herd of Highland cattle. As far as I am aware there are no pure bred herds of Galloways or Polled Angus in the province. A few years ago there were several herds of Shorthorns of good quality at the coast, but of late years, these have been nearly all dispersed owing to the fact that the principal market for bulls is in the range districts where they prefer animals grown under range conditions. For this reason also the Ontario grown bull is not popular on the range. Pure bred range bulls sell for $60 to $100, according to quality.

For close ranging, and on the smaller ranges where feed is more plentiful, the Shorthorn is preferred, while on the larger ranches where the animal's rustling abilities have to be depended on almost altogether, the Hereford has the preference. Yearlings, and upwards, are the age used and they are kept for about four years. One bull is turned out for every twenty-five or thirty cows and the calf percentage runs about 50 to 60 per cent. The calves are castrated in June and are weaned in November; they are usually fed hay all winter.

Thin cow stock are also fed some hay, while steers in this climate require some feeding about two winters in every five. Where feeding is carried on it is estimated that from 800 to 1,000 pounds of hay per head, consisting of clover, timothy and brome grass, will winter a mixed herd of cattle in fine condition under ordinary circumstances. Alfalfa is successfully grown in some districts where it provides an excellent winter feed; in other districts it winter kills badly. Under the above system three-year-old steers are turned off in the summer weighing from 1,200 pounds to 1,300 pounds, while cows run about 1,500 pounds.

Some years ago a few consignments of 'dogies' were brought from Ontario but they did not give satisfaction, and the shipments were discontinued.

Practically all the beef produced in British Columbia is marketed between June 15 and January 15, the price obtained being three cents for cows and three and one-half for steers at the railway shipping point. During the rest of the year the supply is obtained from Alberta. Much better prices would be obtained if the animals could be held over and marketed in the late winter and spring, but there is little prospect of this being done with hay running from $12 to $25 per ton.

A large modern abattoir has been established at Vancouver within recent years and many cattle are shipped there. The cattle buying and slaughtering business is falling into the hands of large concerns and the small retailer is rapidly disappearing.

It is expected that with the opening up of areas suitable for ranching in the northern part of the province which are now being tapped by railways, that the range cattle output will hold its own, but little change can be looked for in the immediate future in the districts already settled as other lines of animal husbandry offer much larger profits than the production of beef under existing conditions.

Predatory animals do not cause much loss on the ranges. Occasional losses are caused by bears and panthers but these do not amount to much. Owing to the country being more or less heavily stocked with game little loss of live stock is caused by wolves, which are able to get their food in the forests. Coyotes are not credited by ranchmen with doing much damage. Some cattle men would like to see them protected on account of their destruction of gophers and other animals of a similar nature.

Range cattle here are practically free from disease. Tuberculosis is almost unknown on the range, while cattle mange does not exist in British Columbia. A small outbreak of Black Leg was reported last year in the range country but, this should be easily controlled by the use of the preventive vaccine now supplied by the Health of Animals Branch at the nominal price of five cents per dose.

Great improvement could be made in the cattle industry by the irrigation of larger areas of land for the production of alfalfa and other suitable forage to be followed by a more liberal system of winter feeding. This should be coupled with a careful selection of breeding animals and the use of only pure bred sires of good quality.

The beef cattlemen of the province should form an association and heartily co-operate with one another, bearing in mind that in unity there is strength. One of the first objects of this association should be to improve market conditions and to ensure graded prices according to the quality of their stock. Another matter that will need attention in the near future is the systematic re-seeding of the ranges with the valuable bunch grass which apparently will be exterminated in some places if some method is not soon adopted for its conservation.

HOUSING.

The housing of cattle may be considered a necessary evil. Cattle would be better wintered out of doors were it not for the severe spells of weather which would cause suffering and loss. The disadvantages of the Canadian winter for cattle raising have undoubtedly been over estimated. In an effort to protect cattle against the climate it became the general practice among the more advanced stockmen some years ago to endeavour to maintain in the stable a temperature approaching June. In this the provision of nature to clothe the animals with a coat for the winter season was quite overlooked. Barns were built so close that they were kept warm from the bodies of the animals. Fresh air—the very life of live stock—was shut out, or so nearly so as to compel the inmates to breathe over and over again their own breath. The bank barn became a popular structure and was built as early and as expensively as the prosperity of the proprietor would allow. Many a farmer has burdened his business in order to build a stone basement barn, which, in later years, has come to be recognized as an enemy to the vigour of the herd. Actual experience has taught that the basement barn, as constructed with few windows and without provision for ventilation, is a failure and such are no longer built in progressive districts.

While as shown in the section of this bulletin for the western provinces cattle are being profitably fattened out of doors it is nevertheless necessary for best results to provide some sort of shelter for the breeding herds, young stock, and feeding cattle. Warmth, however, is not a necessity. So long as cattle are protected from cold winds, storms, and dampness, they will withstand moderately low temperatures without serious results. Nature supplies the necessary covering in a thickening and lengthening of the coat, provided the demand for it is allowed to assert itself naturally. In the prairie provinces, which have a dry atmosphere and plenty of sunshine, well grown, vigorous cattle thrive well out of doors if given shelter from the wind and a dry bed. In the eastern provinces the more moist and changeable climate makes outdoor winter feeding impracticable, so that for these provinces housing is necessary for all cattle during the winter season.

Good air, sunlight, and dryness are the chief considerations in a cattle barn. When to these are added convenience for work, economy of construction and maintenance, we have the essentials of a good barn. The shape is not important, provided it allows for the chief requirements. The round barn has its advocates, some prefer the square or rectangular form, while others again like the L-shape, or even two wings providing fine shelter for the yard. As a security against total destruction by fire two or more smaller buildings have advantages when separated by some distance. Undoubtedly the most popular barn for the cattle raiser has a basement, or lower story, beneath a roomy superstructure for storing food and bedding. Such an arrangement lends itself to economy of construction and convenience in feeding.

The lower story, which, for obvious reasons, should be built above ground, should not be less than 9 feet and need not be more than 11 feet high inside. The height of the superstructure will depend upon the storage room required, as modern fodder-lifting machinery overcomes height in filling. It is an advantage to build on a slight incline both for drainage and easy access to the barn floor. The wall should not, however, be built against a high bank. The back wall may be banked three or four feet high, provided numerous windows are arranged above it to let in the light.

Lighting.

The lighting of a cattle barn is of great importance, but it can in no measure take the place of ventilation. No disinfectant is as effective as sunlight in the destruction of microbes. Where light freely enters dirt and dust are likely to be removed. Cattle enjoy the sunshine and will choose it out of doors in a winter day before a close, dark stable. They need it for their comfort and health and the attendant requires it to enable him to keep the place clean and in order. Windows are as cheap as wall, and when double, they are quite as warm. To admit the maximum of light, windows should extend well down the wall. Bars or rods across the lower half will prevent breakage by the stock. While east, south and west, windows are most important, the north wall also should be supplied. It is hardly possible to admit too much light. About one-third of the wall above a line four feet from the floor should, when practicable, consist of windows. Nor should interior fittings be of such a nature as to obstruct the light. High partitions and feed racks are not necessary, and, as far as practicable, iron piping, or angle-iron, should be utilized for stalls. Heavy wire fencing for inclosing and dividing loose boxes is airy and substantial for young stock but bulls require more solid partitions. Such fittings not only allow the light to reach remote corners but also facilitate the working of a system of ventilation.

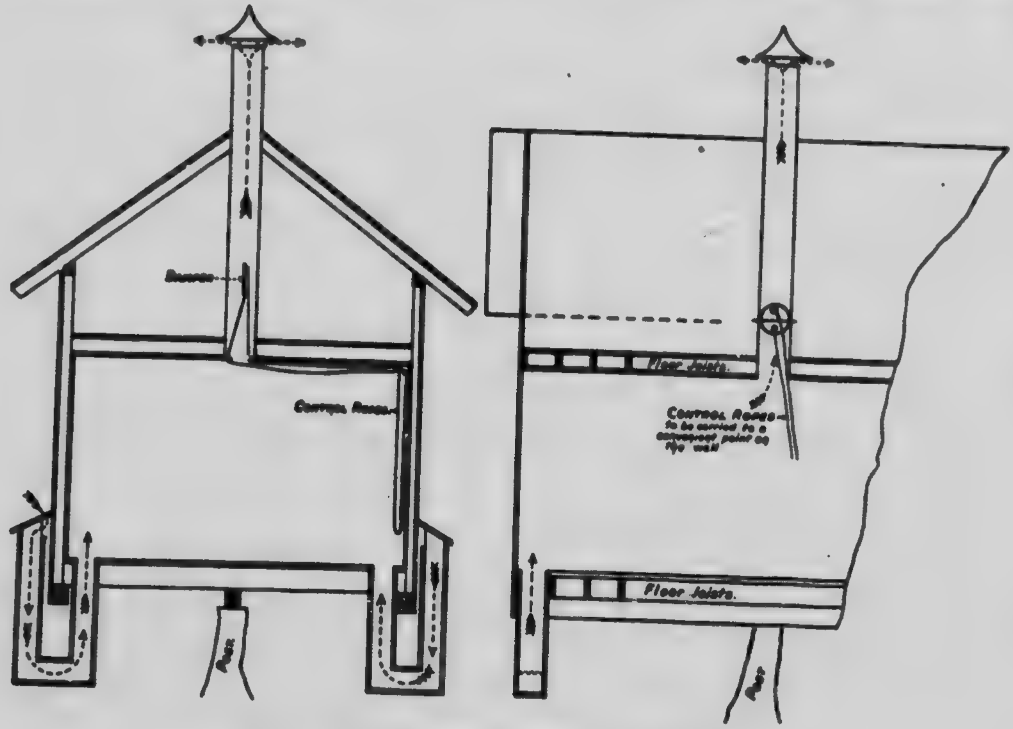
Control Rope
Floor Joists.
Control Rope to be carried to a convenient point on the wall
Floor Joists.

FIG. 60. THE RUTHERFORD SYSTEM OF VENTILATION.
Cross Sections, End and Side Views Showing Principle of System Designed and Placed in Practical Operation by Dr. J. G. Rutherford, H.A.R.C.V.S., C.M.G.

Ventilation.

Many experiments have been carried out to test the value of ventilation, more especially with dairy cattle, but also to some extent with beef cattle. In a test conducted at the Wisconsin Experiment Station it was shown that dairy cows lost weight, gave less milk and drank more water while stable ventilators were closed as compared with similar periods while ventilation was provided.

The test was with 2[illegible] cows and lasted 14 days. Ventilation was provided for two days and withheld two days until the last period when the tests lasted three days each.

During each period of no ventilation each animal drank eleven pounds more water, lost fifteen pounds of weight and gave an average of ·55 of a pound of milk less per cow. They ate practically the same food under both conditions. The experience was the same for each period while the test lasted. At the end of the fourteen days the cows were turned out and, without an exception, every animal deliberately licked herself until not only the hair was removed in spots but sores were created. The itchiness was undoubtedly due to the overloading of the skin with impurities that could not be got rid of by way of the lungs. This kind of irritation and rubbing off the hair has been observed by every cattle feeder who houses his stock in warm, unventilated stables. Such a condition is never observed when stock are allowed the freedom of an open yard or have well ventilated quarters.

The cattle used in this experiment were vigorous milking cows, being well fed. They were accustomed to well ventilated stables. This, no doubt, explains the prompt response to the changed conditions; it also graphically indicates the evil effect of poor ventilation on animals even in healthy condition.

An experiment carried out by Mr. Grisdale at the Central Experimental Farm with beef cattle has even more valuable lessons for the Canadian cattle raiser. During one winter thirty head of steers were being fed in a building 35 by 42 feet, and without a system of ventilation. In another building, similar in every way to the former, except that it was well ventilated, was fed a similar lot of steers, taken from the same lot in the autumn. Both lots were fed and treated alike. In the spring it was found that the gains made by the steers in the poorly ventilated building were much less than those made by the other cattle. The actual difference amounted to a cost of about three cents per pound. The gains made by those in the poorly ventilated stable cost about 8½ cents per pound, while the others put on weight at a cost of 5½ cents per pound. Before the following winter a proper system of ventilation had been installed in the first building, and cattle were fed in both barns under the same system of feeding, with the result that both lots throve equally well, teaching the valuable lesson that it is a very expensive and wasteful practice to feed cattle in an unventilated building. This experience led to the installation of a good system into all the stock barns at the Experimental Farm.

An Approved System.

Contrary to the too general belief that windows can serve as ventilators, as well as to admit light, it may be pointed out that the best results are not secured unless a separate system of ventilation is provided in cattle barns. Ventilation by windows at times admits drafts and is too much influenced by outside temperature and the direction and rate of the wind. Various arrangements of sash to provide ventilation by windows have been tried but at the best without success. An independent system is needed, and that as simple as possible. A system that works under all conditions of wind and weather is what is required. Both inlets and outlets for the air are necessary and these should at all times perform the same functions. An inlet should always be an inlet and an outlet should never give trouble from downward currents.

For a number of years Mr. J. H. Grisdale has been experimenting extensively with various systems at the Experimental Farm. After giving practically all of the approved systems a comprehensive trial in both cattle and horse barns he has reached the conclusion that the 'Rutherford' system is the best. This system, invented a number of years ago by the present Veterinary Director General and Live Stock Commissioner; and found to work satisfactorily in the severe climate of Manitoba, is already fairly well understood. The principle upon which it works is that of the ordinary stove—the stable corresponding to the stove, the animals to the fire, the inlet to the front damper and the outlet for the foul air to the stove pipe or chimney. So long as the walls, windows and doors are fairly close, the animals raise the temperature, and cause the ventilators to work, and this in proportion to the requirements. That is to say, it is automatic in its action. The greater the number of animals and the closer the stable the more rapidly will the system operate. And this is what is needed, not only for purity of air, but for uniformity of temperature as well. In a close stable the degree of foulness of atmosphere corresponds with the temperature, as both are directly influenced by the radiation and breath from the stock.

Figs. Nos. 60, 61, 62 and 63 show the principle of the system. The air warmed by the cattle naturally rises and seeks an outlet. The outlet is necessarily at the ceiling and consists of a flue which passes through the roof. At the Experimental Farm the flues pass through an upper story. These should extend well above the building for the same reason that a chimney must do so in order to draw well.

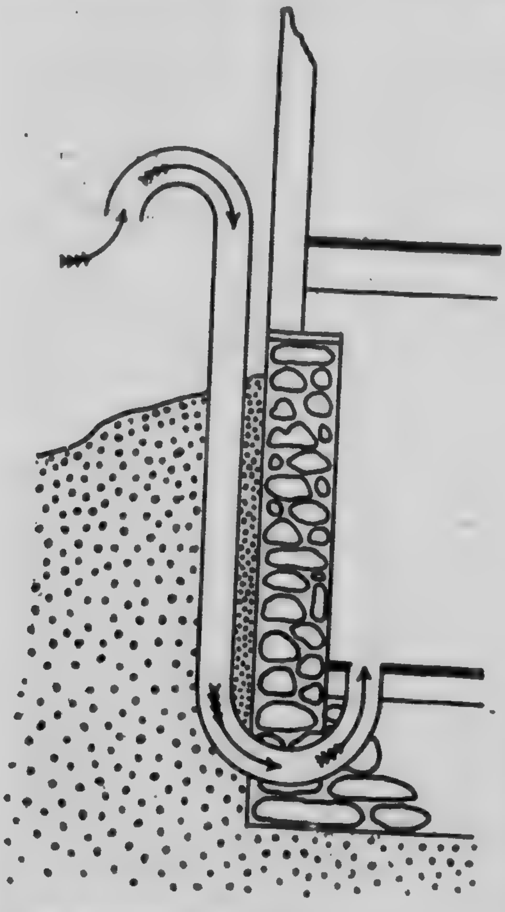

FIG. 61. SECTION OF WALL SHOWING PRINCIPLE OF INLET.

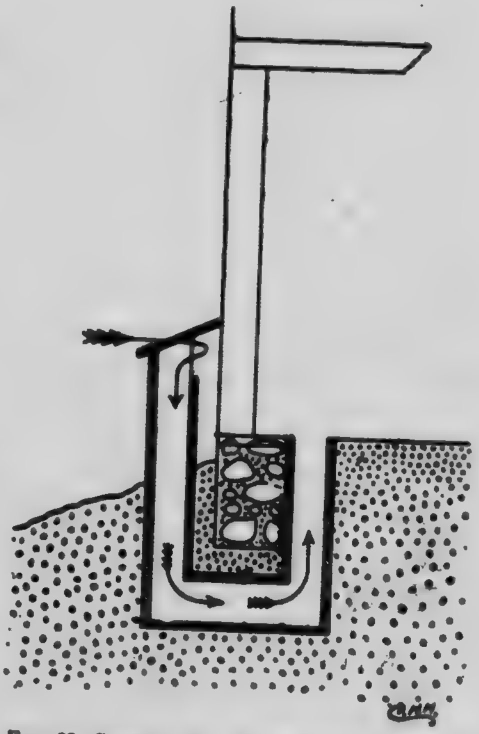

FIG. 62. SECTION OF WALL SHOWING FORM OF INLET USED AT THE EXPERIMENTAL FARM.

The inlets, it will be observed, enter the stable at the floor level. The inlet pipe is U-shaped and passes beneath the foundation wall. If the fresh air is taken from a covered shed the mouth outside may be near the ground level and be protected by a grating. If, however, the air has to be drawn from outside, more especially in districts subject to snow fall, the pipe should extend 4 to 5 feet above ground and the opening should be so arranged as to avoid the entrance of snow or rain, or undue influence from the wind. Fig. 62 shows the arrangement of the flue at the Experimental Farm barns. The roofed pipe is built against the wall, and the air enters through slots in the sides close against the building. The size of these openings corresponds with the capacity of the pipe outside.

The ventilator works by virtue of the natural tendency of warm air to rise. As the air warms it becomes foul, rises and escapes by the outlets. As nature abhors a vacuum the escape of the warm, foul air creates a suction of fresh air by means of the inlet pipes. Since the animals are constantly giving off warmth, the warm, foul air is constantly escaping and cold fresh air is at the same rate entering the stable, thus keeping up a gentle, almost imperceptible system of ventilation. To regulate the ventilation a damper is provided in this outlet flue. The closing of this also stops to a large extent the inflow of fresh air as the draught ceases stopping the suction. By the original system the inlet pipe enters at the floor level. This is to facilitate a steady, unobstructed, almost imperceptible flow of air through the stable towards the outlets. To guard against chaff, and dust falling into the openings, Mr. Grisdale, in the new cattle barn at the 'Farm,' raised the openings about four inches above the floor level. He claims that it works admirably. It is important that obstructions at the ceiling be reduced to a minimum. All beams and joists should be ceiled over. Even a very slight rise towards the opening facilitates the passage of the air. While for convenience it is often necessary to place the inlets along the side or end walls and the outlets at intervals along the centre of the building, the ideal arrangement would be to follow the stove idea in placing the inlets at one end at the floor and the outlets at the other end of the building at the ceiling. The warmed air would rise over the cattle, the outlets would draw it in one direction and that away from the inlet end. This would guard against the possibility of stagnant corners, or of air currents damming each other, and therefore insure a gentle, continuous movement of the atmosphere, with a corresponding purity of air and uniformity of temperature. At first thought it may be considered that a stable thus ventilated would be cold at the floor and warmer towards the ceiling. Contrary to this by actual tests with thermometers suspended at different heights it was shown that the temperature is practically the same at the floor as at the ceiling and at all intermediate heights.

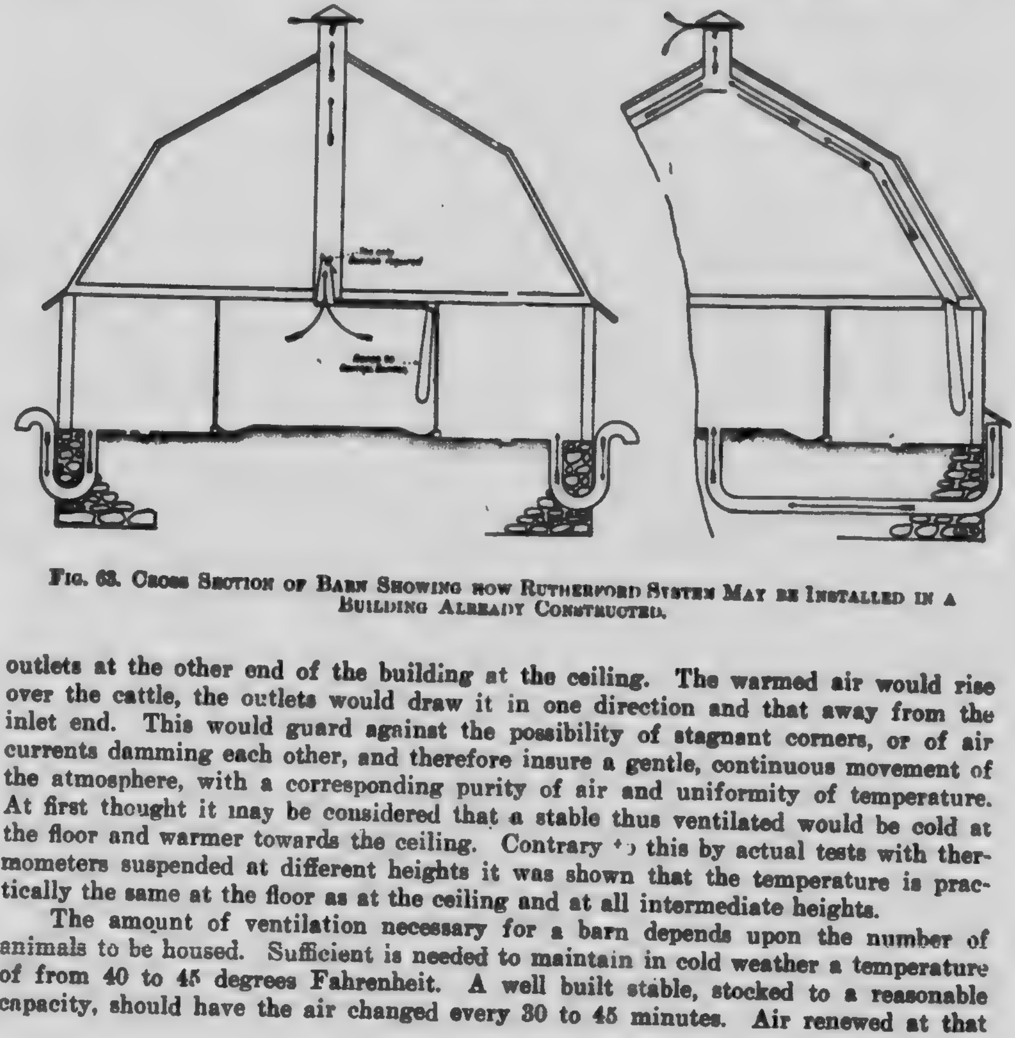

FIG. 63. CROSS SECTION OF BARN SHOWING HOW RUTHERFORD SYSTEM MAY BE INSTALLED IN A BUILDING ALREADY CONSTRUCTED.

The amount of ventilation necessary for a barn depends upon the number of animals to be housed. Sufficient is needed to maintain in cold weather a temperature of from 40 to 45 degrees Fahrenheit. A well built stable, stocked to a reasonable capacity, should have the air changed every 30 to 45 minutes. Air renewed at that

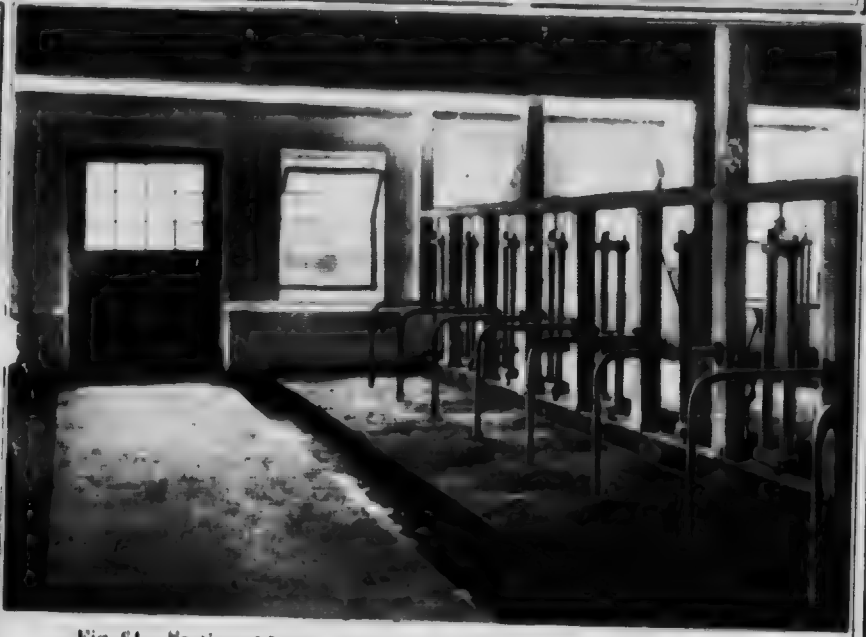

Fig. 64. Section of Interior Main Cattle Barn Central Experimental Farm. (Note provision for light and cleanliness.)

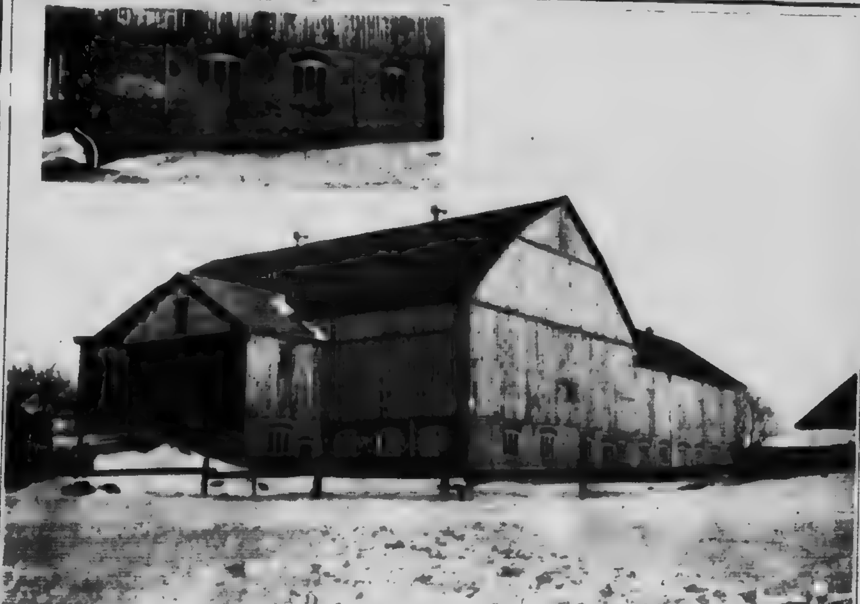

Fig. 65. Barn owned by Biggar Bros., Halton County, Ont. Section at upper corner shows windows, also galvanized metal intake pipes of ventilation system. Interior fittings same as Fig. 64.

rate will carry off the foul air as it is expelled from the stock; it will also remove the vapour, which, if allowed to remain, would condense on the walls and ceilings. Objection has been made to metal flues on the ground that they drip and freeze up. When moisture condenses on the inside of a flue it is evident that the ventilation is insufficient, allowing the air to become unduly moist. It is well, therefore, to provide pipes large enough to admit of being partially closed by slides, or dampers, should the number of animals inclosed be reduced from the maximum that the stable would accommodate. In addition it is well to cover the ventilating flue with building paper and a close fitting wooden box or covering. This is a safeguard against cooling and condensation.

The intake and outlet flues should be about the same in capacity, that is, provided the stable is tightly constructed. Because more or less air is sure to enter around windows and doors, the intake may be slightly smaller than the outlet. At the Experimental Farm this system is in operation in the main cattle barn in which the milking herds are housed, a bull barn, a barn for fattening cattle and a horse stable. The main cattle barn, 120 feet by 50 feet accommodates one hundred head. It has three outlets for foul air each 2 feet by 4 feet, and nine inlets for fresh air, each 3 feet by 10 inches. The fattening barn, 100 feet by 30 feet, which accommodates 50 head of steers has two outlets, each 2 feet square, and three inlets each 3 feet by 20 inches. The bull barn, 100 feet by 30 feet has three outlets about 3 feet square and three inlets each about 3 feet by 20 inches. The bull barn outlets, although considered too large, are stated to work satisfactorily under average conditions. The horse barn which accommodates twenty-five horses, has two outlets, each about 2 feet square and three inlets each about 3 feet by 18 inches. In all these stables the ventilation is good under all conditions of weather.

Convenience.

The cost of securing suitable labour renders it highly important that a cattle barn be arranged so as to save time and steps in tending the stock. This state of affairs has done much to make loose feeding popular. This question is discussed at length under another heading. Every cattle barn should have a number of loose boxes, at least for calves and yearlings, and it is well to make provision for housing loose, at least a portion of the fattening stock. Quiet, dehorned cattle about the same age undoubtedly do as well loose as tied and require much less labour in feeding and removing soiled litter.

The location of the feed room is of chief importance. This should be convenient to the supply of roots, grain feed and coarse fodder. Whether it pays to mix ensilage with other feed is a question that each feeder must settle for himself, and will depend much on the location of the silo. For a barn only wide enough for two rows of stock the best place for the feed room is the end, but for a barn 50 or more feet wide it is more frequently located about midway of the stable at one side, usually at the back. This location is convenient for putting down cut feed from the barn floor, and being in front of the driveway to the barn does not obstruct windows. Where this arrangement obtains, more especially when the barn has a side drive, it is better to place the silo at the end of the building in order to avoid obstructing windows.

The introduction of modern feed and litter carriers have done much to solve the labour problem in the stable. No barn is complete without this convenience, which renders the location of the feed room of less importance than before these were introduced.

Permanence.

The destructibility of wood, and the increasing value of this material, renders it necessary to avoid using it as far as possible for foundation or flooring purposes. Cement concrete is not only comparatively cheap but easily worked, not only for walls and floors but it is well adapted for mangers, etc. Iron inside fittings well put in, carefully selected roofing material and the liberal use of paint on the outside not only improve the appearance of a barn but add greatly to its durability.

A Good Cattle Barn.

Many good barns have been constructed during the past few years. Figs. 65 and 66 represent a modern structure owned by Bigger Bros., in the county of Halton, Ont. This firm rear and feed off beef cattle and took pains in designing this barn to meet their requirements. It possesses the essentials to an unusual degree in the matter of convenience, light, ventilation and durability.

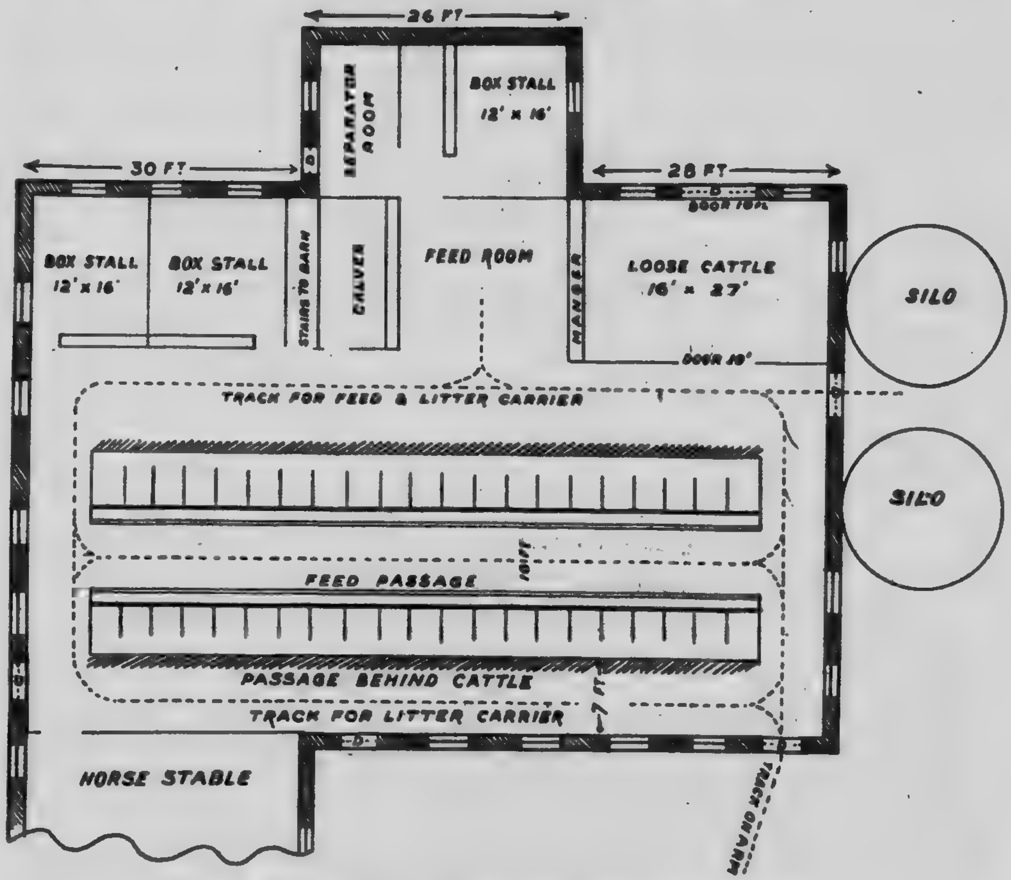

Fig. 66. Ground Plan of Cattle Barn Owned by Bigger Bros.
Stalls and floor same as Fig. 64.

The barn is 56 feet wide and 84 feet long. As shown by the floor plan it accommodates two rows of tied cattle and a row of box stalls. It has 500 feet of over head iron track, including 40 feet on a swinging arm in the barn yard for conveying feed and litter.

The silage is taken direct to the stock instead of being mixed with other food in the feed room. The litter is conveyed outside and dumped in the yard or into a sleigh or wagon to be hauled direct to the field.

Fig. 64 shows the stall plan. The manger consists of a trough running along the side of the raised feed alley. The tied cattle are fastened with swinging stanchions. The barn has a complete water supply provided by windmill power. Each two head of cattle have a drinking cup between them. The stall partitions consist of iron piping set in the cement floor. As shown by the size and number of windows the stable is well lighted. The stable, 56 by 84 feet, has nineteen windows, and the horse stable, 30 by 60 feet, has thirteen. Each window has six panes, 14 by 18 inches. The centre sash is hinged and may be opened on warm days. These, however, are not depended upon for ventilation.

The 'King' system has been installed. By this system the fresh air enters at the ceiling and the foul air escapes by flues which open about four feet from the floor. Fig. 65 shows perpendicular metal pipes attached to the outside wall. These inlets are four inches in diameter and connect with glazed tiles, which pass through the wall. The outlets are four in number, and are placed two on each side of the feed passage. These are carried to the roof where they are continued between rafters, each pair meeting at a metal ventilator shown in Fig. 65 above the peak of the roof. These ventilators are so constructed as to avoid the possibility of down drafts. The outlet air shafts are constructed of double lumber with building paper between. This is to keep them warm, to prevent the condensation of escaping moisture, and consequent dripping or freezing up.

The barn accommodates 40 head of cattle tied in stanchions and 16 head loose, besides two box stalls for calves. As shown it also has a feed room and a separator room and box stalls for roots or stock beneath the double driveway. Two circular silos stand at the east end. The stable walls are ten feet 2 inches high inside. The corner and side posts of the barn above are 18 feet long. As far as possible all doors slide on rollers. When visited on a severely cold winter day the temperature of this stable was about 45 degrees Fahrenheit, the atmosphere was fresh, stock comfortable and contented, and their skins were apparently in a healthy condition.

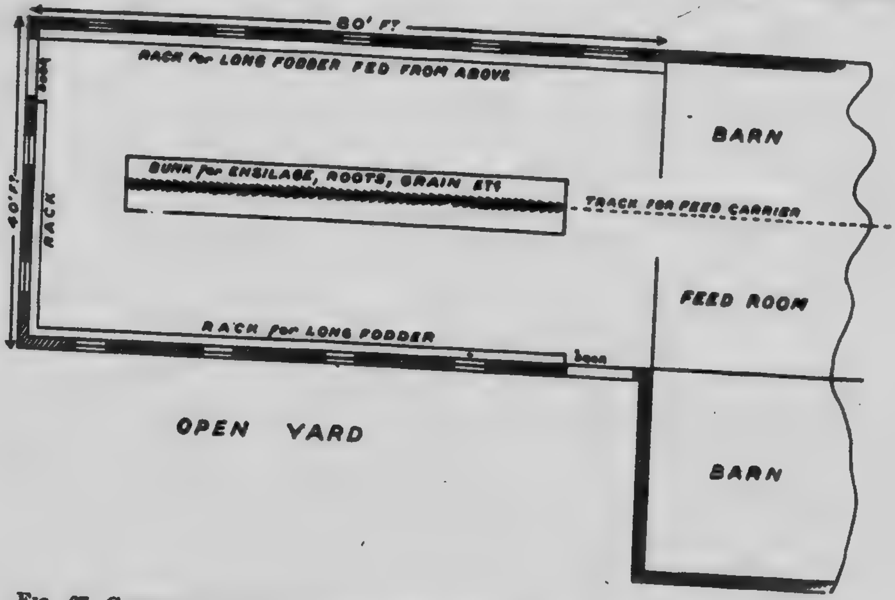

Fig. 67. Ground Plan of Shed for Loose Feeding, Owned by Geo. P. Barrie.

Shed for Loose Feeding.

In the section of this bulletin dealing with finishing beef cattle reference is made to the shed used, and system of feeding adopted by Geo. P. Barrie, near Galt, Ont. Fig. 67 represents the ground plan of Mr. Barrie's feeding shed. Above the shed is a feed loft connected with the main barn from which hay and other fodder are supplied to the racks against the walls for the cattle. The walls are of inch lumber lined and battened. The large door at the side is opened in the morning, allowing the cattle free access to the open yard until night. The walls, windows and ceiling admit of sufficient ventilation to prevent the temperature rising too high during the night, and, since the cattle of their own choice remain out of doors most of the day, this style of shed may be counted a success. In addition to being sanitary, comfortable and convenient to work in, it has the other important feature of cheapness of construction.

MARKETING.

The market is the objective point of every live stock feeder. Unless one can see a return for his outlay and labour, he is not likely to continue fattening cattle. Fortunately there are consumers awaiting the beef, and since it is impracticable for the feeder to kill his cattle and prepare the meat for the urban dweller, and as the urban dweller cannot profitably go to the country for his cuts of meat; markets, abattoirs and shops have been brought into existence. Markets are thus a necessary part of the beef trade of every advanced country; and, the more valuable the live stock industry, the better the marketing arrangements. Beef raisers in certain sections may become justly impatient because of delay in providing marketing facilities; but, as the industry developes, well-organized markets naturally come into existence to meet the needs of both buyers and sellers. So long as a country produces chiefly dairy products, or principally wheat, the markets for beef cattle are sure to be slow in coming. But let the beef cattle industry grow and markets to take care of the supply are sure to come. They have come in the beef-raising provinces of Canada, and are year by year being extended and improved. In Toronto, Montreal, Winnipeg, and at other places, vast sums of money have been invested in fitting up yards and buildings for the selling and buying of stock. At these points, on certain days each week, buyers are on hand looking for stock and ready to pay for it according to values determined by the law of supply and demand. When the supply is short, the feeder has little difficulty in finding a buyer for his finished bullocks. During the past two seasons, owing to almost continuous good markets, many cattle have been coaxed away from their owners before they were fit to be marketed. Country buyers have been more insistent than usual, which has augured well for the cattle raisers, so far as the immediate price is concerned, but it has reduced the out-put of good cattle. To find a market has not been a serious problem to the man in a district where cattle of good quality are produced. Fortunately during the past season comparatively few periods of bad market conditions have been encountered. This has had an excellent effect on the trade. A well known general shortage prevented serious slumps, and confidence in the industry has been the result.

While keen competition for stock continues, the marketing problem will take care of itself fairly well for the man who keeps in touch with values by reading market reports and by paying occasional visits to the larger stock yards. The time will come, however, when supplies will reach a more normal condition, and then the country drover may neglect to make his weekly or monthly rounds. It is well, therefore, to do a little experimenting in patronizing the big markets. It seldom pays a feeder with only a few head to undertake to sell his own stock, although there is no reason why a bright fellow should not, after some experience, make as good a bargain as any one else. A man with a car load often sells; but, as a rule, it is more satisfactory to select a good commission firm, and consign stock to them. Many drovers deal with these men, knowing that they are in a position to get the last dollar for the stock. It is the business of these firms to find markets, and they must, of necessity, keep in close touch with all available outlets. They learn the requirements of exporters and butchers, and are always ready promptly to dispose of cattle of whatever class which may be consigned to them. Through these men many half-fat cattle find their way back to the country to be finished.

Just when to market cattle is a serious problem. While the good ones well finished always sell most readily and at highest price per pound, it is not always expedient to hold cattle until ripe for the best trade. One's supply of rough fodder must be a strong factor in deciding a matter of when to sell. It may or may not pay to buy concentrated food, but it seldom pays to purchase roots, hay or ensilage for beef making. Feeders, after considering the age, quality, and condition of their cattle, should decide, when putting them on a fattening ration, how long they should be fed, and then feed and market them accordingly. It is safer to do this one year with another than to follow the policy too often pursued of getting the cattle ready and then waiting for the market to become satisfactory. In times of normal supply too often the consequence of such a policy is a heavy run of stock and a serious drop in values just at the wrong time.

There are shippers in most beef-raising localities anxious to buy good cattle from old customers at a fixed price to go at a stated time. Many Christmas, Easter and May cattle are sold in this way. One must decide from his own judgment and experience whether it is better to sell in this way or ship to a commission firm when the cattle are ready. Neither plan is always better than the other. It is a fact, however, in so far as Ontario is concerned, that more and more export cattle are bought in Toronto instead of at the farms, as was the rule years ago. Exporting firms, that a few years ago had buyers going about the country, have withdrawn them, and now depend on the cattle coming to them at the Stock Yards.

It is the privilege and in fact, almost the duty—of the man who has cattle to sell to keep himself informed upon the condition of the market. He can do this by the market report, and by telephonic communication with his dealer; and, in addition, he would do well to visit the market from time to time to see how trade is carried on, the relative value of cattle of different classes, and make the acquaintance of men in the business. There is much valuable information a feeder can pick up during visits to a large market, especially if he accompanies a shipment of his own feeding with the purpose of interesting buyers in him and his cattle.

Grades of Cattle.

In a market like Toronto, Montreal or Winnipeg, cattle are graded as exporters, butchers, stockers, feeders, and canners. Butchers are subdivided into Nos. 1, 2 and 3. Exporters are not necessarily better finished, or worth more per pound than butchers, but they are usually a bit larger and heavier. A strong, fleshy bullock stands the shipping well, dresses out a good weight of beef, and it costs no more for ocean freight for a large animal than for a small one. Heavy exporters go chiefly to London, Liverpool and Glasgow, while many less heavy steers are taken to Manchester. Buying for this latter market is creating a competition for butcher's stock to the advantage of the seller. While there is still a large but decreasing number of unfinished grass cattle, more particularly from Western Canada, and known as 'ranchers,' exported to Great Britain, the great bulk of exporters are of good to choice quality, and weigh from 1,200 to 1,500 pounds. The selling value is more a matter of finish than weight. Top-priced steers exhibit a well-bred appearance, and carry sufficient flesh and fat to dress out from fifty-five to fifty-seven per cent of carcass.

The majority of cattle, exclusive of feeders and stockers, sold on Canadian markets belong to the butcher class. These are valued largely according to condition as regards finish. They are usually younger and smaller than exporters, and those of No. 1 class are quite as well finished and usually bring as much a pound. A 1,200 pound bullock that will dress out fifty-eight or more pounds of carcass to the live hundredweight will command a premium over the quotation for No. 1, which dresses out a smaller per cent of carcass. At no season of the year is the percentage of this class large, and this keeps up the price. From Christmas to June the supply is most generous, but during the remainder of the year grades two and three are by far the most common. No. 2 cattle are less well finished, dressing fifty-two to fifty-four per cent, while No. 3 includes thinner stock and lower grades, often showing dairy form and colours. Most butchers' cattle are slaughtered in the cities where sold, although a good number of cars go out from Toronto during the year for Montreal and intermediate points. In this age of large abattoirs and refrigerator cars, many towns that years ago were supplied by beef killed at home now depend on the large meat companies in Toronto and other points for their supply. This condition is centralizing the trade and building up yards, and improving facilities whereby buyers and sellers are brought together to deal in a thoroughly businesslike manner.

Stockers and feeders include calves, yearlings, two-year-olds, and older cattle that are to be sent back to the country for further feeding. Each is graded according to age, quality and condition. The younger class, usually weighing from 500 to 800 pounds, and known as stockers, are frequently bought to keep a year or more before they are ready for beef. Feeders are not only older and larger than stockers, but are, as a rule, better fleshed. Feeders under 900 pounds are not as popular as heavier cattle, and many bullocks more than half fat, that would make fairly good butchers' cattle are preferred, more especially in spring, to finish on grass for the June or July market. While such cattle cost high prices, if well bred and thrifty, they put on weight rapidly—forty to sixty pounds a month—and come back No. 1 beef, usually for export.

Preparing Cattle for Shipping.

It pays to prepare cattle for shipment in order to reduce as far as possible shrinkage during transit. Grass cattle should be yarded for a couple of days, and fed hay, preferably timothy, and if grain has been fed the ration of this should be reduced. A few day's feeding on dry oats, about five pounds a head, is recommended by good cattlemen. Water should be allowed constantly until the morning they are to leave the farm, and care should be taken to drive them leisurely to the station. This method will reduce scouring and shrinkage to a minimum.

Shippers need never load cattle into dirty cars. The law compels railroad companies to clean all cars before sending them out. Cars should be bedded with straw, sawdust, sand or other material, that will prevent the cattle from slipping or becoming sore. The expense of bedding the car must be paid for by the shipper. Cattle cars vary in size, and are charged for according to their length. It pays, therefore, to fill the car well, as no rebate is made for underweight, although extra weight is liable to be charged up to the shipper. Cattle ship better when fairly tight in the car, more especially if they are, as they should be, of about uniform size. A good load for a 36-foot car is from eighteen to twenty head. If the cattle are to be on more than twenty hours it is well to put 200 to 300 pounds of good hay in each car. If the car is not provided with racks, the hay should be strewn along the sides and ends where it is least liable to become trampled under foot.

Cattle that have been properly prepared and comfortably shipped will reach the market in a normal state ready for a drink, which will, with a good feed of hay, put them in attractive condition for the buyer. An excessive fill on the market is often detrimental to a good sale, as buyers detect such a condition, and are apt to neglect cattle so filled until late in the day, when they may have commenced to scour, lose weight, and look mean. Feeding grain in excessive quantities to cattle on the market is an unwise practice, and should be condemned. To secure weight by this method became a common practice on the Toronto market, until in February, 1910, when buyers issued a notice in which they jointly pledged themselves to refuse to buy cattle, which after arrival on the market, had been given any other feed than hay and water.

THE PRINCIPLES OF FEEDING.

A feeder may place in his stables or feed lot, lean cattle of excellent type and have stored in his barns food of the highest quality and yet fail to profitably turn out high-class beeves at a profit. That is to say he may administer the food in such a way as not to secure an adequate return for the food consumed. The successful feeder requires experience and when to this is added, either from his experience or the teaching of others, an accurate knowledge of the principles of animal nutrition he is well fortified to manage a stable of fattening cattle.

It is interesting to know something about the general composition of the body of farm animals. The amounts of water, nitrogenous matter, fat, etc. in a large number of animals have been determined by experiment stations and some of the general deductions which have been arrived at from these analyses will be given. In farm animals it is not uncommon for half the body to be composed of water. This proportion is largest in young animals, and as age advances the tendency is for the proportion of water to become less. During the fattening process the proportion of water in the body is reduced. Of all the solid constituents present, fat generally occurs in largest proportion, and this proportion increases very greatly during fattening. In the case of a fat bullock, fat might form about one-third of the carcass. The nitrogenous matter amounts to from 10 to15 per cent, and although its proportion tends to increase as the animal gets older, yet during the fattening process the proportion diminishes on account of fat being laid on at a greater rate. The ash of the animal body, or that which remains after the animal body is burnt, is very small, amounting only to about 3 or 4 per cent. The animal with the largest proportion of bone contains the largest proportion of ash constituents. It might therefore be roughly stated that a fat bullock is made up of about one-half water, one-third fat and one-sixth nitrogenous matter.

It is important to know the nature of the increase in young animals as compared with old, because here lies an explanation of the economy in early maturity. In the case of young animals, the increase consists largely of water and lean meat, while in the older or mature animals the increase is largely fat, and is of a drier nature. Thus it is that older animals are not so economically fed as younger animals; the higher proportion of lean meat in the increase of young animals is altogether in their favour.

In the case of the living animal there is constant demand for renovation of tissue, and, and in the case of fattening animals, for the production of increase; the heat of the body must be kept up, and energy is required for mechanical work. All these results are obtained from the food consumed and appropriated by the animal.

The solid parts of food are conveniently divided into albuminoids, fats, carbohydrates, and salts. These all have distinct functions in the animal body. The albuminoids contain nitrogen, carbon, hydrogen, oxygen and sulphur, combined together in complex fashion. These when consumed by the animal, and after being digested form the albuminoids of the animal body—hair, wool, horn, etc., are also produced from the albuminoids. In some cases fat may be formed from them and body heat and mechanical force may also be developed. Although fat, body heat, and mechanical force may be supplied by the consumption of albuminoids, it is advisable to let this part be supplied by the fat and carbohydrates, and preserve the albuminoids more for flesh formation. The power of albuminoids to form flesh (lean meat) hair, wool, horn, etc., is quite unique, as none of the other ingredients of the food have this power.

The fats in the food, after being digested and taken into the circulation, may be stored up as fat in the body, or, they may supply heat and mechanical energy to the

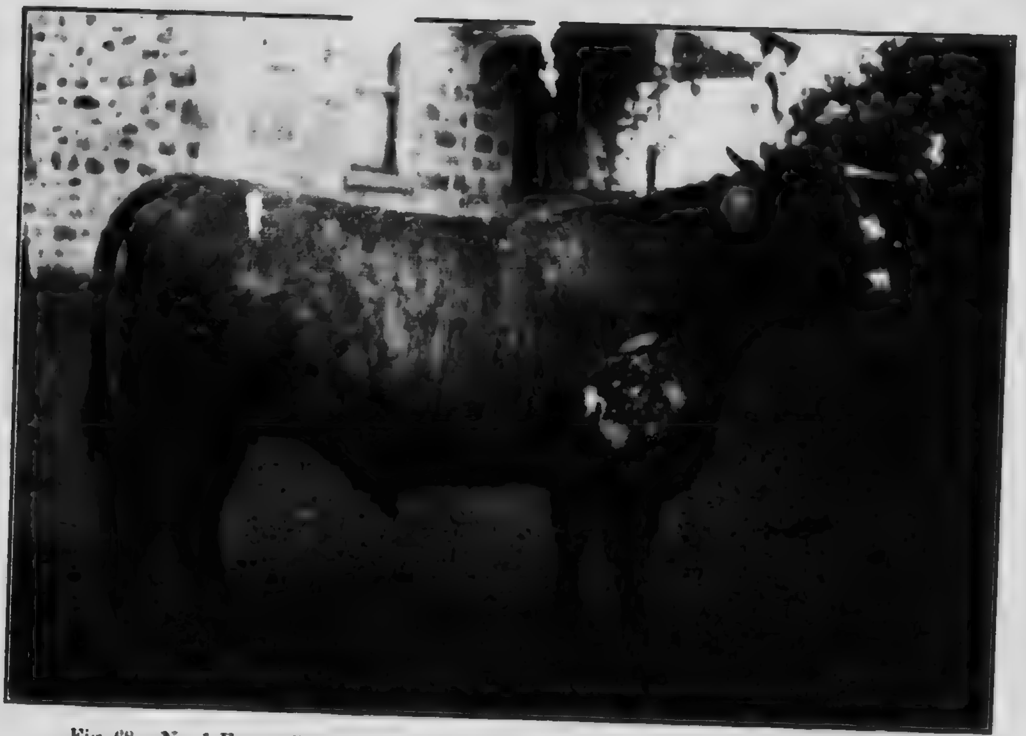

Fig. 68. No. 1 Export Steer, two years old. Weight, 1,400 lbs. Estimated dressed weight, 812 lbs., or 58 per cent.

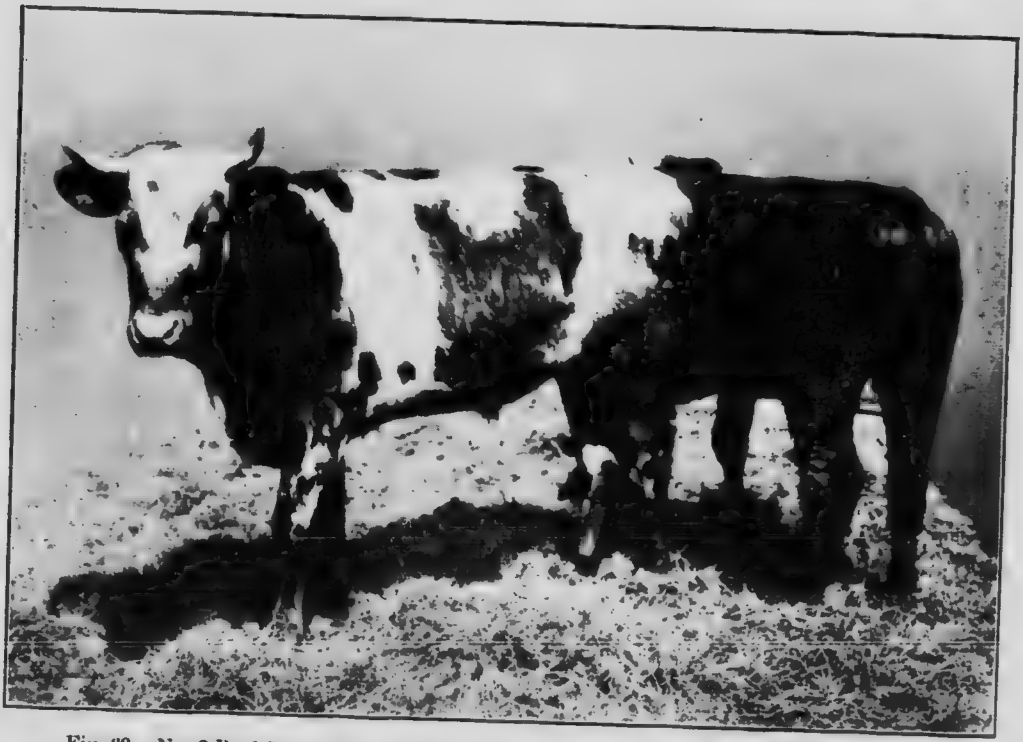

Fig. 69. No. 2 Beef Cattle. Live weight, 1,780 lbs. Dressed weight, 943 lbs., or 53 per cent. of live weight.

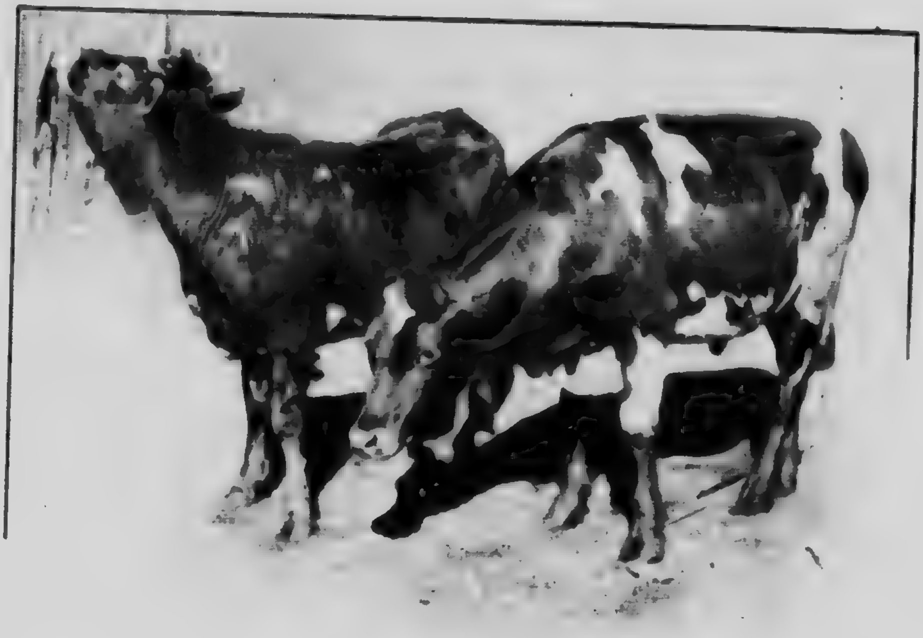

Fig. 70. No. 3 Beef Cattle. Live weight, 1,750 lbs. Dressed weight, 870 lbs., or 50 per cent. of live weight.

Fig. 71. A Good Butcher Heifer. Would dress about 53 to 54 per cent.

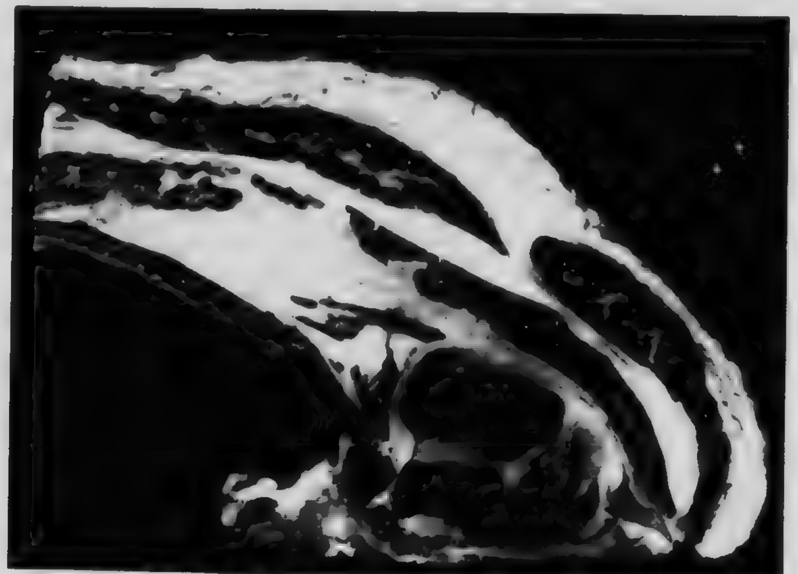

Fig. 72. Rib Roast from an International Champion Steer.
Total weight (four ribs), 30 lbs.; bone, 4 lbs. 4 oz.; meat 24 lbs. 6 oz. Meat of superior quality.

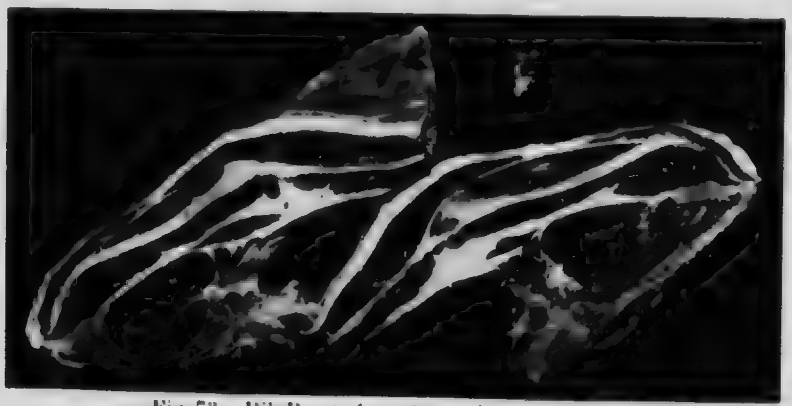

Fig. 73. Rib Roasts from Steers shown at Fig. 69.
Total weight (four ribs), 20 lbs.; bone, 5 lbs.; meat, 15 lbs. Meat of good quality.

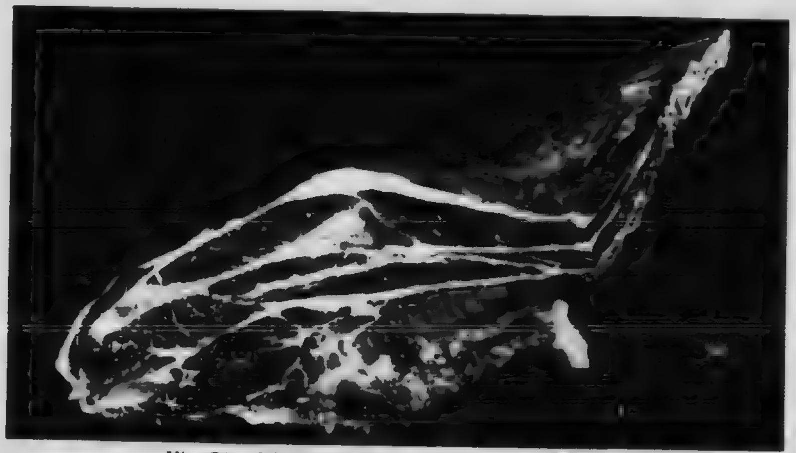

Fig. 74. Rib Roast from Steer shown at Fig. 70.
Total weight (four ribs), 17 lbs.; bone, 5 lbs.; meat, 12 lbs. Meat of poor quality.

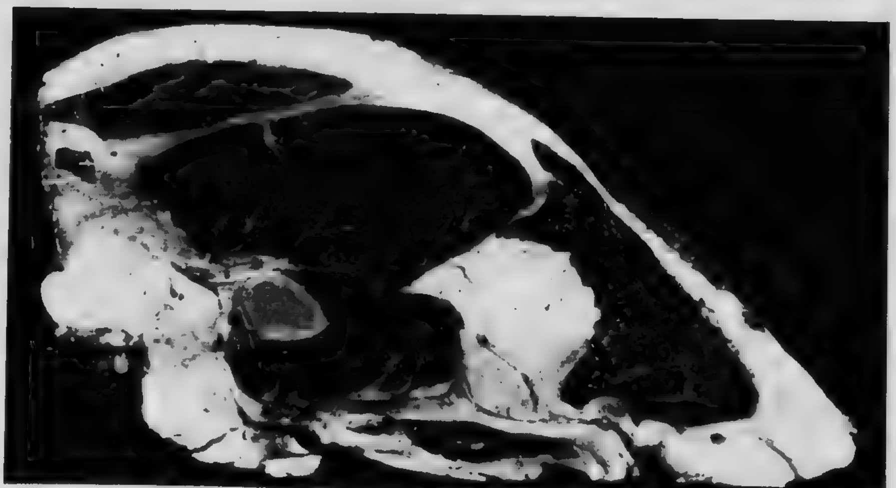

Fig. 75. Loin cut from International Champion Steer.
Total weight, 40 lbs.; bone, 4 lbs. 8 oz.; meat, 35 lbs. 8 oz. Meat of superior quality.

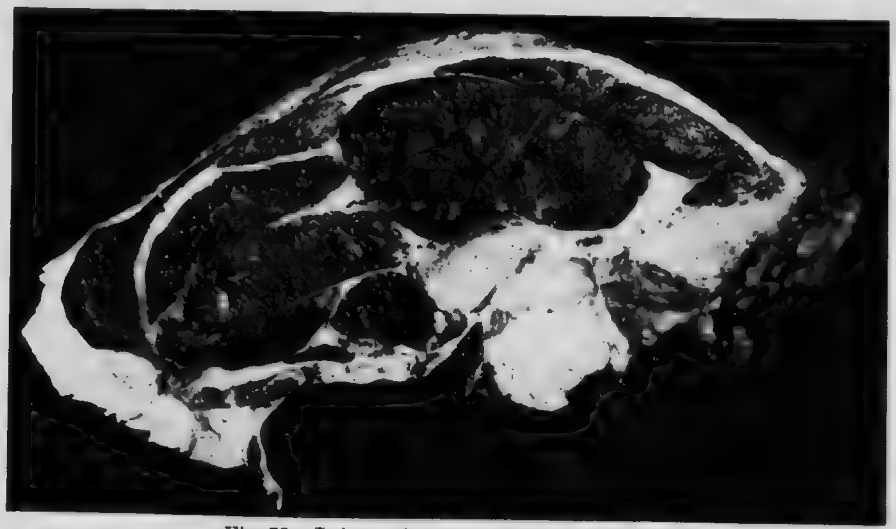

Fig. 76. Loin cut from Steer shown at Fig. 69.
Total weight, 30 lbs.; bone, 5 lbs.; meat, 25 lbs. Meat of good quality.

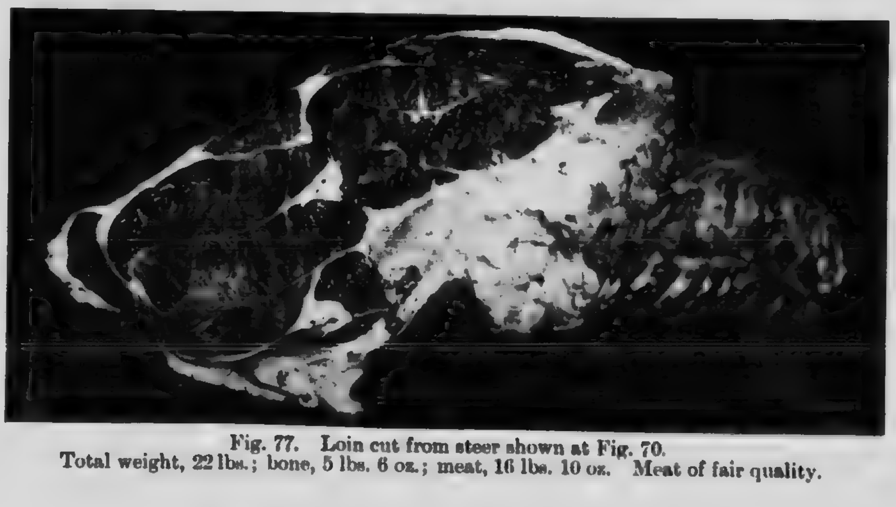

Fig. 77. Loin cut from steer shown at Fig. 70.
Total weight, 22 lbs.; bone, 5 lbs. 6 oz.; meat, 16 lbs. 10 oz. Meat of fair quality.

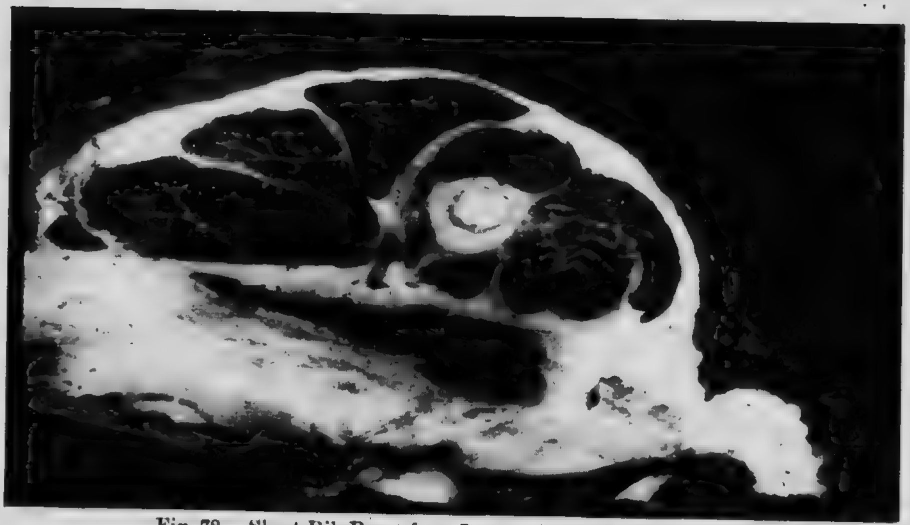

Fig. 78. Short Rib Roast from International Champion Steer.
Total weight, 60 lbs.; bone, 11 lbs.; meat, 49 lbs. Meat of superior quality.

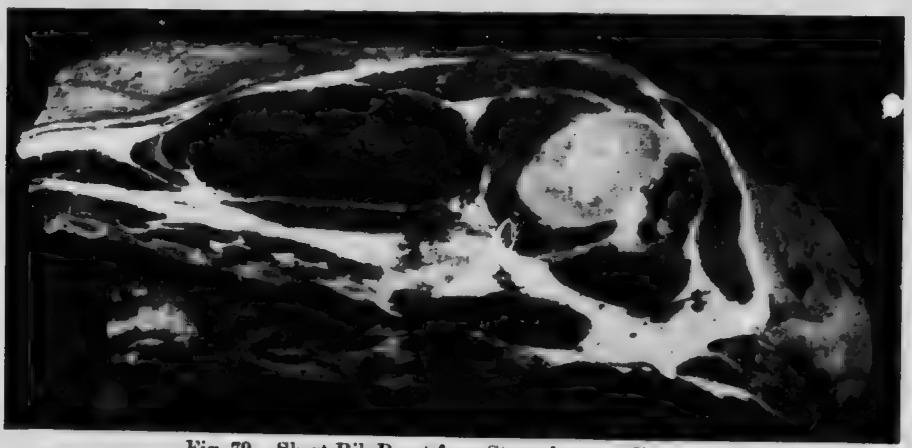

Fig. 79. Short Rib Roast from Steer shown at Fig. 69.
Total weight, 40 lbs.; bone, 12 lbs.; meat, 38 lbs. Meat of good quality.

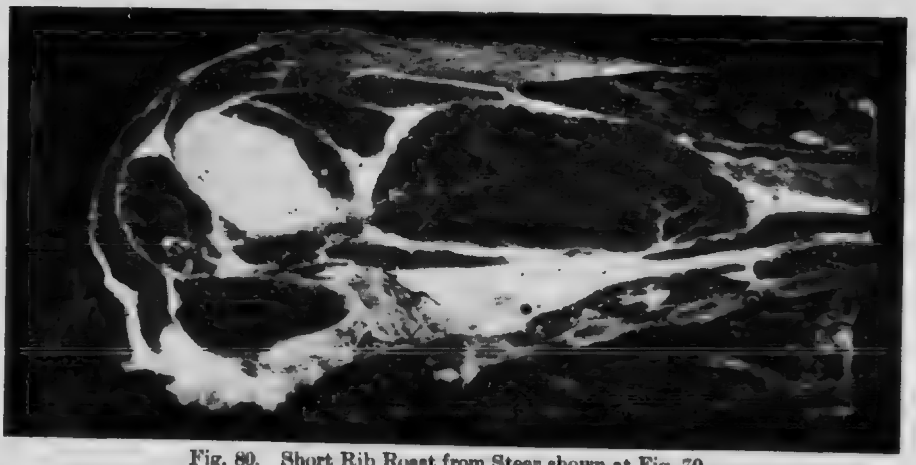

Fig. 80. Short Rib Roast from Steer shown at Fig. 70.
Total weight, 35 lbs.; bone, 12 lbs. 8 oz.; meat, 22 lbs. 8 oz. Meat of poor quality.

system. As a heat and force producer fat has a higher value than carbohydrates. The fats in the food contain only carbon, hydrogen, and oxygen, and are quite incapable of adding to the nitrogenous tissues of the animal.

The carbohydrates, like the fats, contain carbon, hydrogen, and oxygen. These when taken into the circulation supply the animal with heat and energy capable of doing mechanical work. If fed in excess they may produce fat. The great thing is to have them present in the food in sufficient quantity to supply the body requirements of heat and work, and thus prevent the albuminoids from being used for this purpose. The salts in the food enter into the composition of bone, etc.

After learning the functions of the different constituents of foods, a brief account of the process of digestion will show how the food becomes absorbed into the circulation. In the case of the bullock the food is swallowed and remains in the paunch or first stomach for a time to soften and become mixed with the juices contained in it, then the food is thrown back into the mouth and chewed as cud. This chewing has the effect of mixing the food with the saliva, and gradually converting the starchy part into sugar by the action of a ferment in the saliva called ptyalin. The food now more or less fluid in character passes along into the fourth stomach, or the true digestive stomach, and mixes with the gastric juice secreted by it. This acts on the albuminoids and converts some of them into soluable bodies called peptones, by the action of a ferment called pepsin. Passing into the small intestines the bile attacks the food, and acts chiefly on the fat; and to complete the work the pancreatic juice acts on the carbohydrates, fats, and albuminoids, rendering a large proportion of the food soluable. The dissolved or digested portion is absorbed into the circulation largely through the walls of the small intestine and is carried by the blood to all parts of the body where the different ingredients perform their respective functions. The heat in the body is produced by the oxygen of the air passing into the blood through the lungs and combining with the fats or carbohydrates in the blood. This combination or chemical change which takes place results in heat being generated and the animal body being warmed.

The value of a food is largely determined by four principal characteristics as follows: (1) Analysis or chemical composition; (2) Its digestibility; (3) Its palatability; (4) The purpose for which it is intended.

It has been pointed out that the important constituents of a feeding stuff are albuminoids, fat or oil, and carbohydrates. It is important to know to what extent these are present and in some cases it is also an advantage to know the percentage of fibre also. As to the relative value of albuminoids, fat, and carbohydrates, this varies according to circumstances. For the production of heat in the animal body oil would be about 2¼ times as effective as either albuminoids or carbohydrates; while as a 'flesh former,' albuminoids alone would be effective. Although albuminoids may also give heat and force it is economical to prevent this as much as possible by using fat and carbohydrates in addition. In fact, each of these three ingredients has distinct functions, and should all be included, the important thing being to include them in suitable proportions. If relative values were allocated it would be approximately correct to give albuminoids and oil 2¼ times the value of carbohydrates.

Digestibility.

The chemical composition alone may be no sufficient guide as to whether the ingredients are present in an easily digestible form, but the origin of the feeding stuff generally gives us some enlightenment on this point. Where a food is derived from a ripe or matured seed such as cereal grains, linseed, cotton seed, etc., the composition, as well as the digestibility will not vary seriously. It is foods rich in fibre, such as hay and straw which have generally to be watched. With hay and straw crops the ripeness at cutting time has a great effect—the riper it gets the larger is the proportion of fibre in the food, and this at the expense of the more valuable ingredients.

Palatability.

It is highly important that a food should have an agreeable smell or flavour which causes the animals to eat it with relish. This is a value distinct from composition or digestibility. It excites the appetite and causes the animal to eat it eagerly. It also increases the flow of digestive juices. In some cases a food palatable to one animal may not be to another. The employment of some condiment or appetizer may be useful either where the animal has lost its appetite or the food has been slightly damaged. The value of these condiments is generally due not so much to the composition as to the possession of a particular odour or flavour.

A successful feeder knows the importance of having a food which passes through the animal system at a rate which is neither too fast nor too slow. Food which passes through too quickly is not likely to be so well digested as it would be if it passed through more slowly although it would be equally undesirable to have it passing too slowly. Certain foods have the power of regulating the rate of passage of the food, and on this account have a special value. These may be divided into laxatives and astringents. Some of the best laxatives we have are roots, grasses and oilcake, while very important astringents are straw and cotton seed meal. Good mild astringents are crushed oats and wheat bran. Then, again, where the basal ration is poor in any particular ingredient, the addition of a food rich in that ingredient balances the food, and often gives results greater than its composition would indicate. In addition, it would also be necessary to see that the food was in good condition.

In a bulletin of this character it is not practicable to enter into an elaborate discussion of the principles of feeding. In the foregoing sufficient has been stated to indicate something of the nature of foods usually fed to cattle and the principles of digestion and assimilation in the animal body. Those interested in a further study of the scientific side of the subject would do well to secure an authentic treatise such as 'Feeds and Feeding' by Henry; 'Feeding Farm Animals' by Shaw; 'The Feeding of Farm Animals' by Jordan; 'Profitable Stock Feeding' by Smith; 'Beef Production' by Mumford; or 'Feeding Animals' by Stewart. Such works are procurable from any bookseller or they can usually be obtained from the publishers of Agricultural Journals.

DEHORNING.

Cattle as now reared and cared for are better without horns, which have come to be regarded as harmful appendages and useful only to the extent that they improve the appearance of animals wearing them. Many years ago cattle raisers conceived the idea of protecting the weaker animals from the stronger and vicious ones by removing the points of the horns or attaching brass knobs. Towards the end of the past century the entire removal of the horns became general practice in many sections. The success of this system, which has greatly simplified the tending and housing of cattle, has left no ground to stand on for those who would prevent the operation from a humane standpoint. Careful observation and investigation have demonstrated clearly that suffering caused by the operation on even mature animals is trivial as compared with the damage that even one mean old cow frequently commits on the other members of the herd in the field, the yard and at the watering trough. Before the advent of the practice of dehorning to house loosely horned cattle that were more than a year old was inexpedient whereas dehorned cattle of any age are run together at all seasons of the year with as little risk from injury from each other as sheep cared for under similar conditions. And yet dehorning is not as general as it ought to be. One feeder living in a remote district argues against loose feeding on the ground that the cattle would hook each other. To remove the horns from a pure bred herd of which the owner is justly proud might well be considered wanton disfiguration, but, to preserve intact the defensive appendages of a bullock is at least of doubtful wisdom.

Cattle are most easily dehorned during calfhood. Caustic potash is the usual agent employed while Gillet's lye does a satisfactory job. The action of these agents when properly used is to destroy the life of the horn in its early stage rendering the treated animal a smooth headed beast, deprived not only of the instruments of defence, but to a large extent the inclination to bully its mates. Dehorning by potash or lye is done before the animal is ten days old or as soon as the button-like embryo can be located on the calf's poll. The hair surrounding the spot is clipped off and the parts moistened with soapy water. When using the potash in the stick form it should be wrapped in paper to protect the hand and an exposed end moistened and rubbed gently on the buttons in turn for about five minutes or until they become sensitive and red but not to the extend of bleeding. Care must be taken that the dissolved potash does not run down the side of the head, or the skull may be seriously burned and permanently disfigured. If carefully done a scab soon forms, healing follows and the spot becomes covered with hair from the surrounding part. With some calves the operation may be done at four or five days of age while in others it is necessary to defer the operation for a few days longer. If treatment has been neglected until the calf is two or three weeks old the horns may yet be killed with Gillet's lye. The preparation of the horn is the same as for caustic potash. The powder is moistened and worked into a paste which is applied and rubbed well in with a knife blade or piece of wood. It is a safe practice to apply grease or oil to the skin around the horn to protect those parts from the action of the lye, but no oil should touch the part to be treated. The calf dehorned by either potash or lye should be kept from getting wet during three or four days following treatment so that the dissolved caustic will not run down and burn the skin. The calf will suffer some pain for an hour or two but no other inconvenience is experienced. Treated calves should be tied separately so that they cannot lick each other.

Horned cattle not treatetd while calves may be readily dehorned by either an ordinary meat saw or dehorning clippers. The pain of such operation has been overestimated and the mortality is practically nothing. The exact loss of flesh due to excitement, loss of blood and pain, is difficult to estimate, as very much depends upon the skill of the operator, and perhaps more still, upon the temperament of the animal operated upon, nervous; irritable animals, suffering a greater set back than quiet, sluggish ones. In any case the loss is seldom great. At the Central Experimental Farm no great difference was observable in the effect of the different instruments used in dehorning except that there was but very little blood lost where the saw was used.

It is not advisable to dehorn in very cold weather nor should it be done during fly time. March, April, October and November are favourable months.

To secure an animal for dehorning a strong post or stanchion is necessary or, if much of it has to be done, it is worth while to erect a dehorning chute. For a small herd it does very well to use a stall partition post to secure the animal. The victim should be backed into the stall and its head securely fastened to the post. A lead ring attached to the nose takes the animal's attention from the operation. In addition a rope should be put on in such a way as to form a noose over the nose to give control of the head. A dehorning chute is simply a strong stall built in the yard with the forward end so arranged that the stanchion may be closed tightly on the animal's neck close to the head. The head when thus fastened should be not more than 20 inches from the ground. A noose firmly held completes the fastening.

Either the saw or clippers may be used and there is little to choose between them. The saw as a rule makes the neater job, but, the clippers perform the work more rapidly. Occasionally clippers crush the bone causing a slow healing. Unless the horns are taken off very close they bleed badly and stubs grow. The cut should take about one-sixth of an inch of the skin around the base of the horn and should be slanted with the natural slope of the head. Some animals bleed severely. To prevent this wind a piece of strong twine firmly around the head just below the horn bases so as not to interfere with the operation. Then tighten the twine by drawing together the upper and lower strands mid-way between the horns and fasten with a knot. Twine put on in this manner presses firmly against the large arteries. In a few hours the twine may be removed when danger from bleeding will have passed. Dehorned animals should not be allowed to rub against hay or straw stacks until the wound has healed. An application of carbolized oil or pine tar and lard after bleeding ceases will hasten the healing.

An examination of cattle from day to day in large markets proves that many cattle are badly dehorned, allowing stubs to grow out from the head. In many cases the stub turns down curving in penetrating the skin, even to the extent of creating a festering sore. This condition is objectionable for two reasons—1st. in causing pain and therefore reducing the gains by the animals; 2nd, cattle having ingrown horns are rejected for export. Almost every week a number of animals in export shipments have to be withdrawn and disposed of locally. While a small proportion of cattle thus turned back have not been dehorned, the great majority of them have been subjected to the process of dehorning which has been imperfectly done. A horn that is not killed or removed below the base will grow out an abnormal stub and is liable to turn in toward the head causing damage. In dehorning, therefore, care should be exercised to do the job thoroughly.

ESTIMATING THE WEIGHT OF LIVE CATTLE.

Long experience in the cattle trade may enable a feeder or dealer to estimate an animal's weight fairly closely. At times, however, even the experienced are out when the scale is applied. The beginner, when the scales are not at hand, usually guesses either too high or too low. We have seen a 1,100 pound animal's weight variously estimated at from 850 to 1,250 pounds,—a wide difference of 400 pounds and that among farmers who had been raising cattle but usually selling per head in place of per hunderd weight. This is but one instance of the hundreds similar that have come under our notice in recent years.

Where the stockman does not have a scale the following table of weights based upon heart girth measurements will be found to give an approximately fair idea of an animals weight. The girth should be taken just back of the shoulder and forelegs at the place where the body is shallowest. This place may be found by drawing the tape back and forth a few times before tightening to take the measurements.

Heart Girth.		Store Cattle.		Fat Cattle.	
		Fair condition.	Good condition.	Fair condition.	Good condition.
Feet.	Inches.	Lbs.	Lbs.	Lbs.	Lbs.
5	0	650	700	700	750
5	1	675	725	725	775
5	2	700	750	750	800
5	3	725	775	775	825
5	4	750	800	800	850
5	5	775	825	825	875
5	6	800	850	850	900
5	7	825	875	875	925
5	8	850	900	900	950
5	9	875	925	925	975
5	10	900	950	950	1'000
5	11	925	975	975	1'025
6	0	950	1,000	1,000	1.050
6	1	1,000	1,050	1,050	1.100
6	2	1,050	1,100	1,100	1,150
6	3	1,100	1,150	1,150	1.200
6	4	1,150	1,200	1,200	1.250
6	5	1,200	1,250	1,250	1,300
6	6	1,250	1,300	1,300	1,350
6	7	1,300	1,350	1,350	1.400
6	8	1,350	1,400	1,400	1,450
6	9	1,400	1,450	1,450	1.500
6	10	1,450	1,500	1,500	1.550
6	11	1,500	1,550	1,550	1,600
7	0	1,550	1,600	1,600	1,650
7	1	1,600	1,650	1,650	1.700
7	2	1,650	1,700	1,700	1.750
7	3	1,700	1,750	1,750	1,800
7	4	1,750	1,800	1,800	1,850
7	5	1,800	1,850	1,850	1,900
7	6	1,850	1,900	1,900	1,950

FRESH BEEF FOR THE FARMER'S TABLE.

In country districts, except where farmers co-operate to supply themselves with fresh beef, the meat diet of the people as a rule consists of pork, especially during the summer months. In certain favoured sections through the agency of the local butcher more or less beef is used throughout the year. Too often, however, the available supply of beef thus secured is of inferior quality, being cut from the carcases of old cows or lean cattle unfit to ship to market. When only such beef is available it is used more as a change than as the regular meat portion of the diet. Pork being easily cured and stored has of necessity become the meat food of the people. During the winter season the farmer is able to provide his family with well finished beef fattened in his own barn. At that season the meat can be kept fresh in good condition until used. It is during the more trying weather of summer that fresh meat is especially desirable. The difficulty of securing it has in many districts been overcome by a co-operative system whereby a stated number club together and furnish the animals to be butchered and distributed to the members throughout the season. The associations, which are known by several designations, as 'Beef Syndicate'; 'Mutual Beef Association' and 'Beef Ring' have memberships of from 16 to 40 members and run from a few months in summer, in some cases, to the entire year in others. The most popular membership is twenty and the length of season twenty weeks. To describe the 20 memberships' society will suffice to illustrate the working of the smaller or larger organizations.

A twenty-member beef ring usually runs for twenty weeks, each member supplying one animal during the season. The animal should dress about 400 lbs. which divided gives each member 20 lbs. per week. The beef is cut up according to a chart and each member gets a steak, a roast and a boiling piece each week. It is distributed in such a way that each member will have received all the cuts of a carcass during the season. In this way absolute fairness is meted out to all. In the case of small households, two members together, take one share between them, and of course provide only one animal. Should a member require and receive more than one regular share per week the matter is adjusted at the end of the season according to the price per pound fixed by the society at the beginning of the season. The usual price has for a number of years been about seven to ten cents per pound.

In some districts the sixteen-member ring is most popular, as less cutting is required, and in the case of small families a share between two gives a sufficiency. It has the disadvantage of running for only sixteen weeks in a season, or it may run thirty-two weeks by each member putting in two animals. A small animal dressing 320 pounds is killed each week. Some of the 24-member rings adhere to the 400 lbs. carcass which gives each member a weekly portion of 17 lbs. A ring of this size runs for practically half the year, commencing about the middle of May. The season in some societies commences on May 1 and for the first two monthts a beast is killed every alternatet week, and every week thereafter.

Winter is the best season to organize a society. Having secured a sufficient number of applications for membership a meeting should be held when officers should be appointed and rules and regulations endorsed. Following is a copy of the constitution of a working 'Beef Ring' having a membership of twenty.

Constitution of Beef Ring.

I. This association shall be known as the......................Association, and shall consist of 20 members, whose object shall be to furnish each member with his portion of fresh beef weekly during the specified season.

II. That officers shall consist of a president, secretary and treasurer, whose duties shall be such as usually pertains to such offices; also, a managing committee of three members, whose duties shall be to provide a suitable place for slaughtering, settle all differences in regard to weight, and quality of animals furnished, and the general oversight of the work, and any vacancy occurring in any office shall be filled by a vote of a majority of members present at a meeting appointed by the society, as hereinafter provided.

III. The officers shall continue in office for the period of one year, unless otherwise determined by a majority of said society.

IV. The president and secretary shall be and are hereby empowered to convene all meetings considered necessary by them, and any special meeting at the request of any five members, given in writing.

V. Seven members shall constitute a quorum for the transaction of business.

VI. All persons becoming members of this society shall subscribe to the articles of this constitution, and will be governed thereby.

VII. The annual meeting shall be held at a place and on a day agreed upon, for the purpose of closing up the business of the current year, enrollment of members, election of officers, making arrangements for succeeding year's operations, and for the transaction of such other business as may be brought before the meeting, notice of which meeting shall be given each member by the secretary.

By-laws.

1. The society shall elect one of its members to the position of butcher (whose duties are hereinafter defined) who may engage some suitable person to perform said duties.

2. Each member shall furnish one heifer or steer, the age of which shall not exceed two years, and weighing about four hundred pounds, suitable for the purposes of the society during the season, in his proper turn, said season to consist of twenty weeks, commencing and ending at such times as may be determined at any regular meeting of the society.

3. The order in which each member shall furnish his animal shall be decided by lot at the annual meeting, or at a meeting held at least three months prior to the day of the first killing.

4. Each member shall deliver his animal at the place of slaughter at or before 9 o'clock on the day appointed by the society for the slaughtering of each animal.

5. Each member furnishing an animal shall be entitled to and receive the rough tallow, head and heart of the same.

6. The butcher shall be the judge of the suitableness of all animals furnished, and may reject unsuitable animals, subject, however, to an appeal to the managing committee.

7. The butcher shall weigh each carcass when dressed, and keep an account of the same giving proper credit to the member furnishing said carcass. He shall also cut and distribute weekly, to each member of the society, an equal portion of the same, as near as he can judge in the division, and keep strict account of the amount furnished each member per week, and at the end of each season settlements shall be made with the members of the society, in accordance with the accounts kept by the butcher and the price per pound agreed upon by the society.

8. The distribution of the butcher in accordance with the foregoing rules, shall be accomplished by placing each member's portion on hooks under their respective names at the place of slaughter, or at such other place as may be agreed upon by the society.

9. The butcher shall market all hides and pay over to the treasurer the money obtained by him for the same, and shall receive for his services the sum of two dollars per head for all the animals slaughtered, cut up and distributed by him.

10. The money obtained by the butcher for hides shall remain as a fund in the hands of the treasurer for the purpose of defraying the necessary expenses of the society, and settling the differences of accounts between members at the end of each season.

11. No member shall have the privilege of withdrawing from the society without the consent of the majority of said society, and in no case will a member be allowed to withdraw until his accounts are settled with the society.

12. The above articles and regulations governing this society shall remain in full force and virtue unless amended by a two-thirds vote, after a notice of such amendment has been regularly given.

The System of Division.

The carcass is divided according to a diagram. The accompanying chart Fig. 81 of one side shows a very satisfactory system of division. The other side or half is similarly divided. The following table shows a satisfactory combination of cuts for the different members:—

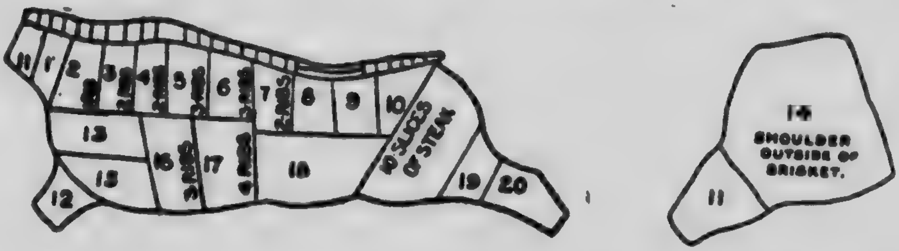

FIG. 81. DIAGRAM SHOWING DIVISION OF CARCASS FOR A TWENTY MEMBER BEEF RING.

Roast.	Boil.	Steak.
1	13	1
2	14	2
3	19	3
4	16	4
5	17	5
6	18	6
7	15	7
8	12	8
9	20	9
10	11	10

Method of Coupling Cuts.

The above table shows the three pieces received from one-half of the carcass by ten members the first week of the season. The other half is similarly divided amongst the remaining ten members. On the second week, member No. 1 drops to No. 2 position and No. 10 takes the place of No. 1. This system is followed during the season. As a rule each member provides himself with two or more cotton bags of good quality each bearing his name. The portions due each member are placed in his respective bag and hung on the hook under his name. Thursday is the usual day for killing and the members go for their meat on Friday morning. With a proper cold storage the meat can be held until the members deside to take it away.

COLD STORAGE FOR THE MEAT.

While freshly killed beef, especially when taken from the carcass of a young and well fattened animal is much superior to salt pork during the warm months of the year it may be further improved by what is termed 'maturing on the hooks.' Beef properly 'hung' is improved both in flavour and tenderness, but more particularly the latter. This to the man living most of the time out of doors is of perhaps little importance as his appetite and digestion are usually good, but to some of the other members of the family tenderness is of some moment. In any case it is very generally recognized that beef improves by hanging in cold storage. Many of the first-class hotels and restaurants adhere to the practice of using beef only after it has hung in a temperature of about 34 deg. F. from four to five weeks. At this low temperature no alteration in the nutritive value of the meat takes place during such a period except that it is rendered more palatable and tender and therefore more digestible and nourishing. As the temperature of the storage rises the maturing, or fermentation, becomes more active and the meat reaches its best condition correspondingly earlier. Beef hung in a storage at 40 degrees would reach an excellent condition for consumption in about ten days and it should be very good at the end of one week. This is about as cold as would be practicable in an ice cooled storage such as a beef ring could profitably provide.

The best method of cooling food products by means of ice is found in the use of one or other of the modern styles of refrigerator in which the ice does not come into immediate contact with the materials to be preserved but is separated from them by a division wall. The meat is thereby not cooled directly but indirectly by the surrounding air. In the refrigeration of meat it is important to have the atmosphere of the storage as dry as possible for the reason that decomposition is hastened by moisture. In high altitudes where the air is extremely dry and pure, beef may be hung out of doors where it will not decompose but dry out thoroughly. At the sea level where the air contains a large amount of humidity meat in the open will readily decompose. It therefore follows that the system of refrigeration to be used should be that which tends to keep the atmosphere dry.

A Small Cold Storage.

A cold storage for a beef ring should be large enough to accommodate at least two carcases at once. Should the members all see fit to allow the meat to hang only one week the extra space would render the room more easy to work in or perhaps to store butter or other products. When an ice house is filled each year a small portion of it may be partitioned off as a cold storage room. With the ice properly packed on three sides and with good drainage, this makes a fairly satisfactory plan for keeping meat although it is by no means equal to a properly constructed refrigerator on account of its dampness.

A refrigerator suitable for use on farms and small butcher shops is described by the Dairy and Cold Storage Commissioner in a recent report. See plan and section in Fgs. 82 and 83. The ice chamber is comparatively small and has to be frequently replenished. The refrigerator proper, including the anteroom, the cold room and the ice box require to be exceedingly well built in order to provide for good insulation. The ice storage need not be expensively built as the ice can be protected by such insulating material as dry straw or sawdust on the sides and over the top.

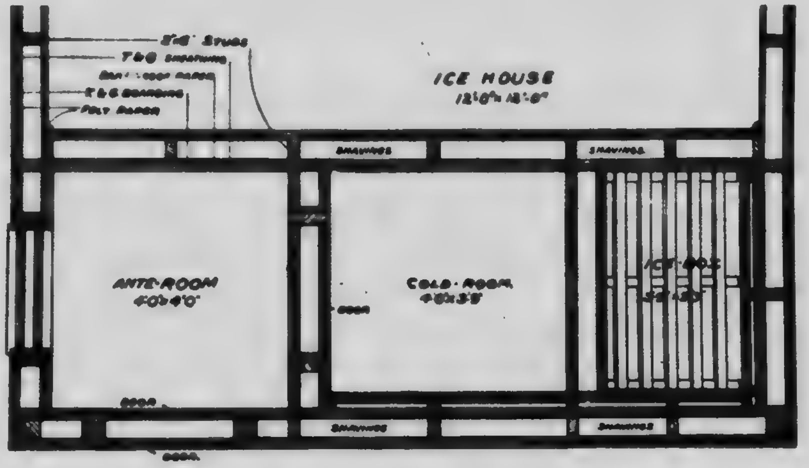

Fig. 82. Ground Plan of Cold Storage.

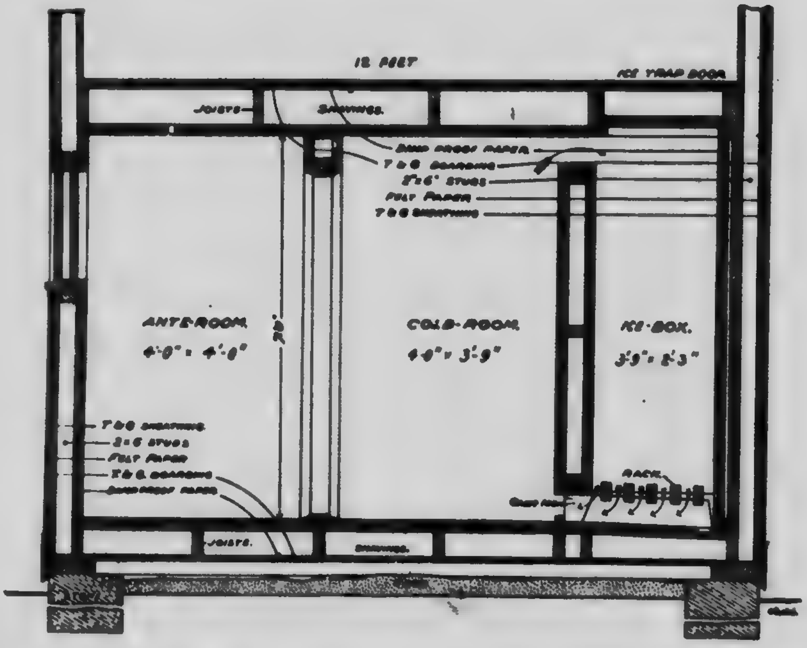

Fig. 83. Cross Section of Cold Storage.

The principle of refrigeration is based on the tendency of warm air to rise and of cold air to fall. This keeps up the circulation by which the air is constantly passing between the chunks of ice in the ice box. As the warm air reaches the ice from the cold room the moisture contained in it is condensed on the ice. This it will be understood keeps the atmosphere in the cold room not only cold but comparatively dry as well.

The size of the refrigerator needed depends upon the use to be made of it. The plans shown provide for a cold room 4 ft. by 3 ft. 9 inches and 7 ft. high. This would easily accommodate two carcases each divided into four quarters. If a larger room is required a correspondingly larger ice box should be provided.

The ante-room is an important part of a refrigerator. This like the cold room should be provided with close fitting hollow or double doors. The ante-room and cold room doors should never be open at once nor should either be left open longer than is absolutely necessary or ice will be wasted. The ante-room may be used for cutting up the meat. Hooks should be placed on the walls to receive the bags containing the shares of the members.

Construction.

All lumber, except clapboards, should be tongued and grooved, and spruce only should be used for the ice box, cold room and ante-room. No tar paper should be used, on account of its strong odour.

The building will be better, and more permanent if placed on a stone or concrete wall. Otherwise it must be well 'banked' to prevent circulation of air underneath.

The extra course of lumber under the siding, also the dead air space, may be dispensed with on the walls of the ice house, *but not on the other parts of the building.*

The partitions between the ice chamber and the other compartments, and also between the ice box and the cold room, need to be well insulated, as shown, to prevent dampness. A poorly insulated partition against an ice chamber will become cold on the surface and consequently collect moisture. Many refrigerators and cold storages are failures from this cause. Emphasis is laid on this point, because thin partitions are occasionally placed between the ice chambers and the cold rooms, on the theory that refrigeration secured in this direct way is all that is needed. Dryness in a refrigerator is just as important as low temperature.

No roof is shown in the plan. That is left to the fancy of the builder. The construction of the ceiling should be the same as the walls and the corners must be thoroughly close.

Sufficient room must be left above the small compartments to allow of the blocks of ice being transferred to the ice box through the ice trap door.

The window in the ante-room has double sash, each sash being double glazed, giving four thicknesses of glass. Shutters are needed to keep out direct sunshine.

The floor under the ice box should be covered with galvanized iron, sloping in the one direction, with a gutter at the lowest edge to carry off the water from the melting ice. The drain pipe from the gutter must be trapped to prevent the passage of air. A simple plan is to have the end of the pipe turned down and extending nearly to the bottom of a small dish or vessel of any kind, so that the water will rise above the end of the pipe before the dish overflows.

Planing mill shavings are highly recommended for filling the spaces between studding and joists as shown on plans. They are always dry and do not become musty. If they cannot be procured, sawdust is probably the next best thing, but it should be *thoroughly* dried before being used.

The spaces between the studding around the ice chamber should not be filled. Any filling will eventually become damp from the ice, and damp material of any kind has very little insulating value.

Management.

As there is no floor in the ice storage, the earth beneath it should be well drained. The surface should be covered with 6 to 8 inches of broken brick, coal cinders, tan bark or other similar material of a non-conducting character. If nothing better can be procured broken or cobble stone covered with a layer of gravel or sand will answer. This material will make a good permanent bed.

Before filling with ice, 8 inches of sawdust should be put over the permanent bed. This should be renewed each year. The ice should be packed as closely as possible, filling all spaces with crushed ice well rammed. A space of 12 inches should be left between the walls and the ice, to be filled with dry sawdust. The top of the ice should also be covered with 12 inches of dry sawdust. If sawdust cannot be procured, hay or straw either cut or long may be used, but the space filled should be 18 inches instead of 12, and the filling well packed.

To utilize the cold room, fill the ice box with cleaned ice in lumps as large as convenient to handle. The box shown on the plans will hold sufficient ice so that it need not be filled often. The openings at the top and bottom of the partition between the ice box and the cold room may be fitted with a slide to regulate the circulation of air.

Particular attention must be paid to keeping the doors perfectly air-tight. A cushion of thick felt for the door to close against is about the best thing to ensure a good joint.

It is necessary to keep the refrigerator as sweet and clean as possible. It is advisable to use a liberal amount of sawdust on the floors so that drippings from the meat may be readily absorbed. The sawdust should be changed, at least those portions of it that have absorbed drippings, at least once a week. Care should be taken to keep doorways through which the carcases pass cleanly washed.

Killing and Cooling Beef.

Animals to be killed should be deprived of food from 12 to 20 hours during which time they should receive all the water they desire. They should be delivered at the slaughter house at least 12 hours before being slaughtered. The killing should be done in the evening and the carcass divided into halves or quarters and hung in an open shed or under a tree over night. A carcass so hung will lose the animal heat, that is to say, the temperature of the carcass will by morning have reached the temperature of the atmosphere. Early in the morning it should be placed in the refrigerator where it should remain until cut up and distributed.

THE FUTURE OF THE INDUSTRY.

It is not only the optimist that predicts a bright future for the Canadian beef raiser. It is generally believed that years of low values have passed and that the cattle raiser who will give attention to the matter of producing bullocks of good quality need have no misgivings in regard to the demand for them.

The development and improvement of transportation and marketing facilities are bringing about a uniformity of values the world over. The countries, that, by reason of the nature of their industries, have to import beef, in a large measure decide the price. In such countries competitors from the ends of the earth meet and accept for their goods values governed by the law of supply and demand.

The reported shortage of cattle and marketable beef that has been evident during the past year has led certain meat trade journals to make the statement that the world is eating up its stock and that sooner or later a meat famine is inevitable. While such prognostications need not be taken seriously it is worthy of note that beef eating populations are at the present time increasing more rapidly than beef cattle. In the whole of Europe, including Great Britain, there were in 1878, 101,000,000 head of cattle, and these by 1908 had increased to 120,000,000. In the British Empire, outside of the British Isles, and therefore including Canada, India and Australia, the numbers went up during the 30 years from 13,000,000 to 23,000,000. Of the remainder of the countries of the world that to any extent carry on cattle raising there remain only the United States and certain South American countries. During the thirty years in question the cattle of the American Republic increased from 46,000,000 to 71,000,000, and of the Argentine from 22,000,000 to 29,000,000. The combined figures representing the number of cattle in these several countries, which include practically the whole of the beef trade, would show an increase from 190,000,000 to 259,000,000 in the thirty years. While these figures do not appear to indicate an early beef famine it is nevertheless true that the beef consuming population of the world has increased at a much more rapid rate. It is this relative rate of increase that concerns the cattle raiser, and this is most clearly demonstrated in the export movement of beef by the foremost cattle countries.

So far as Canada is concerned, Great Britain may be looked upon as the world's market, and her competitors in that market are the United States and the Argentine. From these three comparatively new, fertile, and extensive countries Great Britain has largely secured her fresh, unfrozen beef that could not be supplied at home.

Exports to Great Britain.

A careful study of statistics shows that the export trade in beef to Great Britain is rapidly shifting from North to South America, and if present conditions continue it will not be long before the United States will cease to be a competitor with Canada and the Argentine in the British market. The following tables show the numbers of live cattle and quantities of chilled beef exported by Canada, the United States and the Argentine each year since 1905:—

IMPORTS of Live Cattle into the United Kingdom from Canada, the United States and the Argentine.

Year.	Canada.		United States.		Argentine.	
	No.	Value.	No.	Value.	No.	Value.
		$		$		$
1895	85,863	6,797,615	284,258	26,627,461	39.436	2,982,449
1896	97,042	6,816,361	385,350	35,932,727	65,699	4,495,038
1897	120,063	6,454,313	396,371	37,052,990	73,852	5,613,734
1898	122,106	7,403,990	342,680	31,668,909	89,369	6,576,926
1899	115,476	7,120,430	303,539	27,737,770	85,365	6,777,083
1900	115,056	7,579,080	423,181	33,819,164	38,562	3,248,389
1901	119,050	8,028,476	454,590	36,606,204	None	None
1902	148,927	9,742,738	327,118	24,301,969	"	"
1903	161.170	10,842,438	519,963	37,725,452	27,817	2,217,523
1904	148,301	10,046,651	599,180	41,415,729	None	None
1905	159,078	11,047,167	571,153	41,007,375	"	"
1906	163,994	11,045,463	494,366	38,273,132	"	"
*1907	149,340	10,200,137	401,588	33,796.425	"	"
1908	124,015	8.584,806	277,036	24,034,193	"	"
1909	143,661	10,115,793	184,957	16,274,250	"	"

* 9 months.

CHILLED BEEF Imported into the United Kingdom from North America and Argentine.

Year.	North America.	Argentine.
	Quarters.	Quarters.
1895	990,000	....
1896	1,245,000	....
1897	1,345,000	....
1898	1,381,000	....
1899	1,654,000	....
1900	1,720,000	....
1901	1,909.000	24,919
1902	1,374,000	94,496
1903	1,616,000	142,542
1904	1,438,000	198,200
1905	1,339,000	402,195
1906	1,456,000	454,613
1907	1,451,000	427,042
1908	859,000	767.284
1909	521,000	1,066,134

As will be noticed the chief feature of the above tables is the rapid shrinkage of exports by the United States. Not only have the exports of live cattle reduced in volume, but the quality during the past year has not been up to the standard of earlier seasons. The change in this particular was especially marked during 1909 when the cattle sent were of the coarser and commoner grades. The reason for this was that prices in the home market were higher than in the British market for the best class of stock. The volume of exports of dressed meat from the United States has declined even more rapidly than live cattle. All this is due to the increasing population, expanding industrial activity at home and the decline in cattle population.

Whether or not the improved values will greatly increase the beef stocks of the United States is a question yet to be decided. Those in a position to judge of the future look for the home demand to quite overtake the supply within a few years. Packing house magnates, who have established retail shops in Great Britain and have supplied them from their own abattoirs, appear to see the handwriting on the wall, and already have established plants in the midst of new sources of supply. At Edmonton, Hamilton and Winnipeg, Chicago firms have in operation large packing houses, and at Toronto, the Union Stock Yards have been taken over by a Chicago firm. At the latter point buyers representing some half dozen large United States firms are on hand from week to week to bid for the offerings of export cattle. During the summer months of 1909 through the agency of these buyers more export cattle were shipped from Toronto than from any other point in America, Chicago following next in order for this period.

It is in South America that Chicago firms are extending their business most rapidly. Two of the strongest corporations already have in operation in the Argentine extensive chilling and freezing plants, and are expanding their operations so rapidly as to give currency to the opinion that they are on a fair way to acquire controlling power of Argentine meat supplies.

That the Argentine Republic occupies a favourable position in regard to its future beef production is already demonstrated. Its immense areas of rich, grazing and farming lands, well adapted to the growing of the finest of cattle foods, including alfalfa and corn; its large herds of breeding stock, graded up with the blood of the best British Shorthorn and Hereford families; its temperate climate, rendering the housing of growing and fattening stock unnecessary; and, withal, its enterprising and wealthy stock owners make a combination not possessed by any other country.

As shown by the above table upon exports of live cattle, the Argentine made a creditable beginning in sending cattle to the British market, which trade was stopped short because of disease in Argentine herds. No sooner had this been accomplished than they commenced to ship fresh beef in chilled condition, and to-day they have steamship facilities by which chilled beef is delivered in Great Britain in merchantable condition. The table on chilled beef shows how that country overtook in 1908, and surpassed in 1909, the exports of this product from North America, which means the United States. Indications are that the Argentine Republic, on account of its country, stock and facilities, will very soon dominate the chilled beef supply of Great Britain. With the termination of exports from the United States the demand upon the Argentine will so increase as to quickly show itself in improved values, which will assure the continuation of good prices for beef cattle, not only in the Argentine, but also in competing countries including Canada.

A phase of the question which should not be overlooked is the uncertainty of the supply from South America. As is well known the Argentine is subject to severe droughts, but, against this, must be set the adaptability of much of the country to irrigation. Then the Republic of Uruguay is looming up as a cattle country. It possesses fine grazing lands and much attention is now being given to the improvement of its cattle, of which it has some five million head which are not run in large bands, as in the Argentine, but in smaller herds, as in Canada. This country has already entered the list of those exporting beef and may yet assume an important position in this regard.

The Situation in Canada.

Canadian beef cattle raisers have not been more wise than their neighbours to the south in the matter of keeping up their breeding herds. Both in Canada and the United States during the years 1908 and 1909, when industrial advancement and increase of population were unusually marked, the beef cattle stock has been allowed to fall even behind that of previous years. Figures representing cattle, other than milch cows on United States farms, show a decrease of almost a million head from January 1, 1908, to January 1, 1909, and by the end of 1909 the numbers had fallen off more than 2,000,000 additional head. The actual figures are:—

January 1, 1908	50,073,000
January 1, 1909	49,379,000
January 1, 1910	47,279,000
Decrease in two years	2,794,000 head.

In Canada the situation is little, if any, more favourable in regard to numbers of cattle other than milch cows. Following are the figures for 1901, and for each of the past four years:—

1901	3,167,774
1907	4,394,354
1908	4,629,836
1909	4,384,779
1910	4,033,280

The figures shown in the first four years were the numbers in June, those for 1910 for January 1. They show a normal increase up to 1908, then a decrease of 245,047 up to June 1909, and of 351,499 during the following six months, or a decrease of nearly 600,000 cattle, other than milch cows, in the eighteen months ending with 1909. This is undoubtedly the most unfavourable feature of the beef cattle situation, for just at the time of high prices due to shortage in other countries, the Canadian farmer finds his marketable stock lower than it has been for years. Nor does the immediate future seem bright with hope except for those who have been wise enough to keep up their herds. The high prices have taken from the farms many females that should have been retained for breeding, thus seriously reducing the future supply of cattle. Farmers of the western provinces have been the greatest sinners in this respect. Out of nearly 70,000 head exported from the west in 1909 fully 65 per cent were females, while about 70 per cent of the 80,000 to 90,000 killed for local consumption were also cows and heifers. In addition a much greater number of calves than usual were slaughtered in the west during the year. In the east, more especially the province of Ontario, the situation as regards numbers is even worse. Exports have kept up fairly well but largely at the expense of the future. Cows and heifers have gone out in large numbers and many a stable that usually holds steers fed out heifers during the winter of 1909-10 because steers were not available. Where the supplies for the next five years are to come from is difficult to see. No doubt the province of Alberta will get back into cattle fairly rapidly. The tens of thousands of acres of ranch lands that produced from 70,000 to 80,000 head annually a few years ago will, as farming land in the near future, yield two, three or more times as many cattle. What length of time will transpire before the wheat growers of Saskatchewan and Manitoba will do their share in this regard? Manitoba alone has dropped off 100,000 head during the past two years. Unless these provinces stock up there will be no beef to ship east, and unless the east greatly increases its cattle Canada will soon follow the United States in ceasing to send beef to Great Britain. Great Britain needs a very large continuous supply of imported beef and prefers freshly killed to that which comes in either chilled or frozen. The United States will soon discontinue exporting live cattle and unless the British government again admits live Argentine cattle, Canada will have the field to herself. Whether or not she will get it depends upon the Canadian cattle raiser. At no time has his outlook been so bright as now. He will act wisely if he prepares for it by conserving his female stock to the utmost, producing from them by the use of the best males he can procure, and then, by proper feeding, hasten the male offspring to finished beeves in accordance with the teachings of the foregoing pages.